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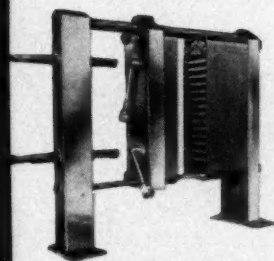
VOL. 86 No. 2195

5 AUGUST 1961

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PETROLAGAR EMULSION	PHOSPHORIC ACID SOLUTIONS	PHOTOGRAPHIC DEVELOPER SOLUTIONS	POLY-VINYL ACETATE EMULSION	POTASSIUM CARBONATE LYE	
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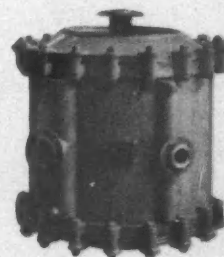
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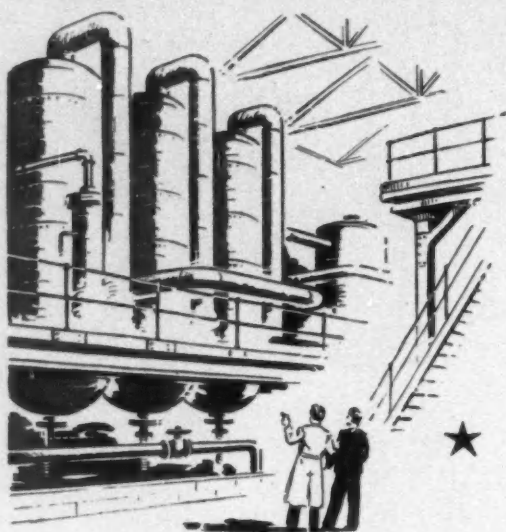
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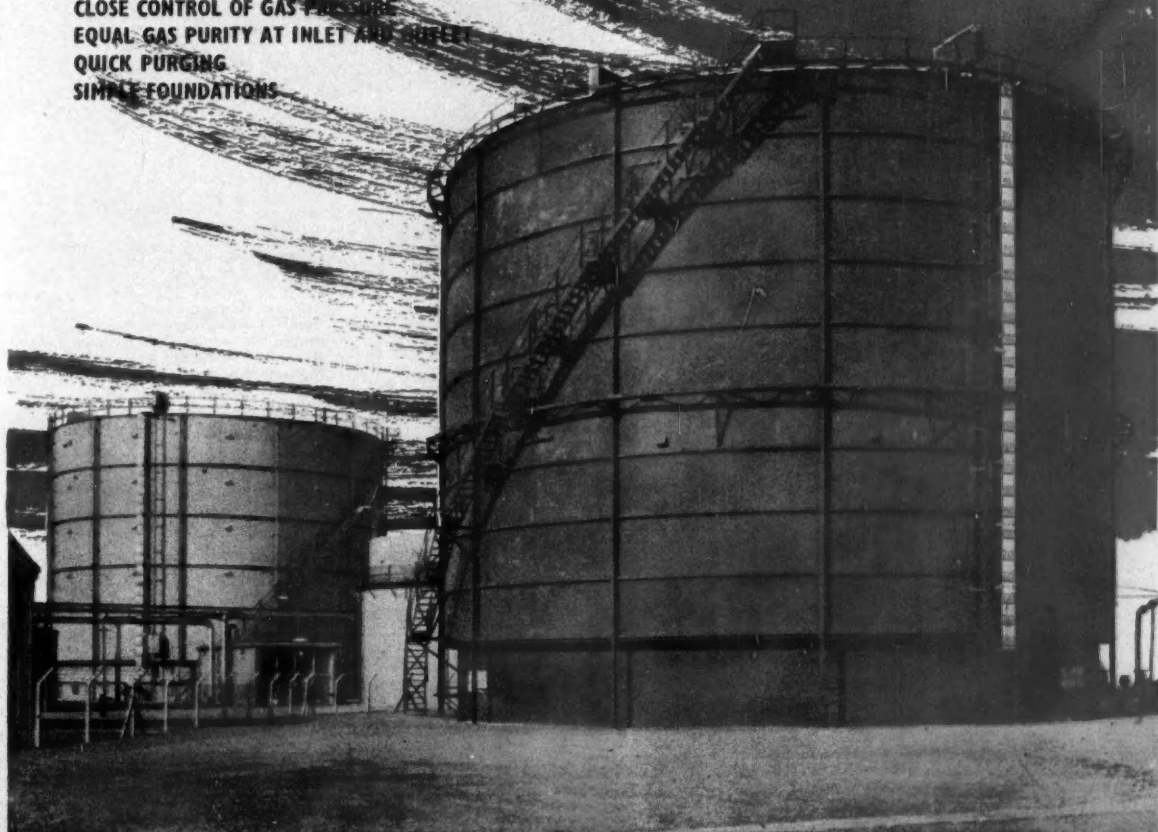
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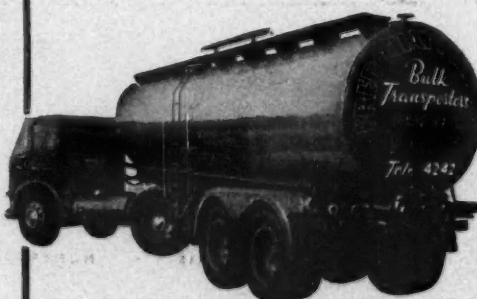
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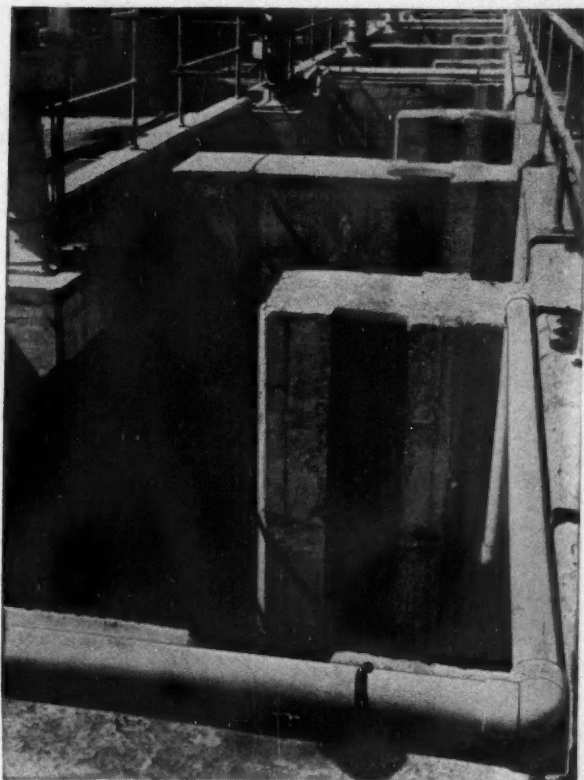
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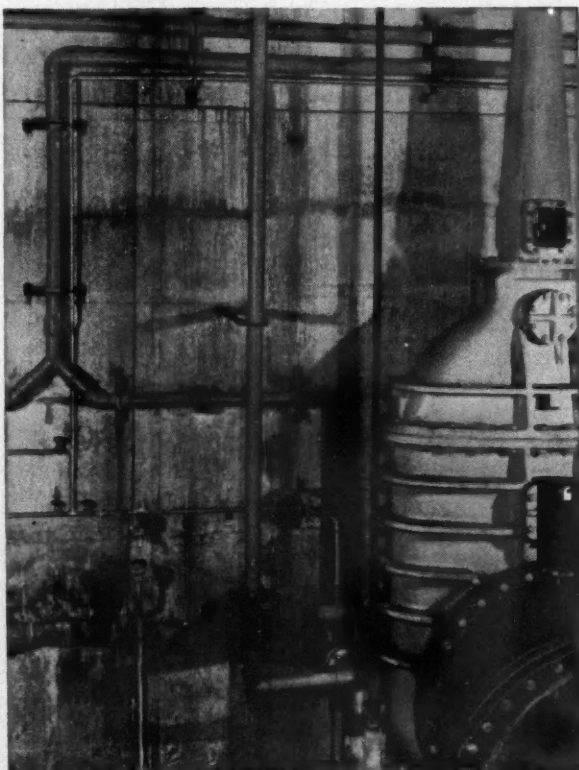
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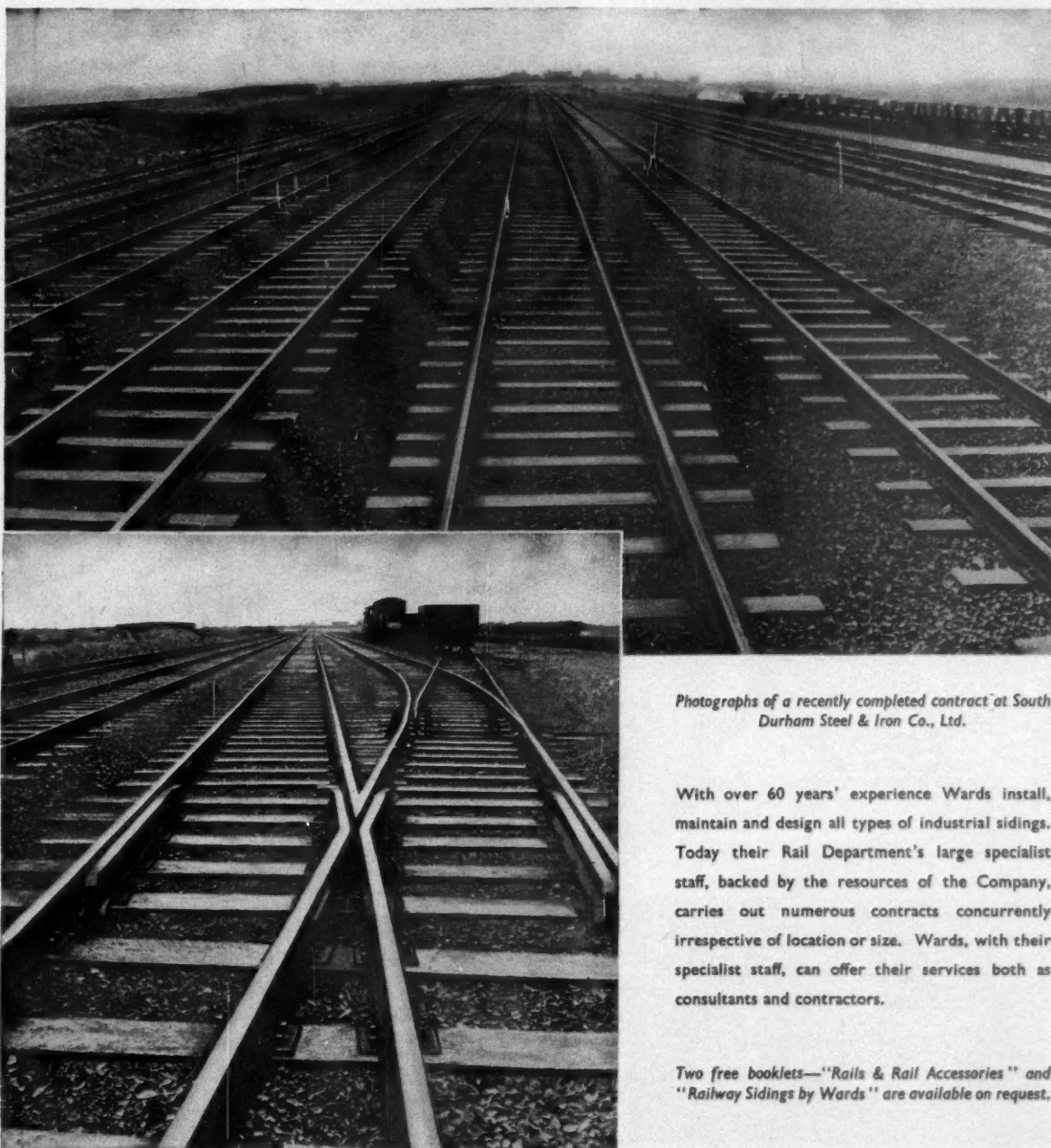
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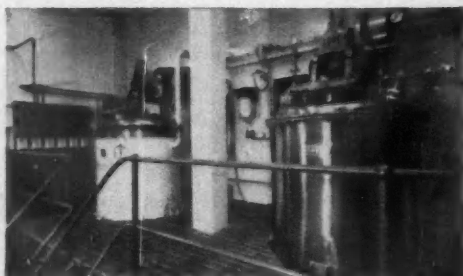
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Chemical Age

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BRITAIN AND THE E.E.C.

THE decision to start negotiations for possible U.K. entry into the Common Market is a welcome one. It has been widely anticipated for some time and as reported in *CHEMICAL AGE*, 17 June, a visit to the headquarters of the European Economic Community at that time showed that Britain's application was confidently expected, with full membership starting on 1 January 1963.

Although the Prime Minister has made it clear that there are many difficulties to be overcome and that the negotiations might well fail, we believe that there is so much at stake—both for the existing E.E.C. countries as well as for this country—that every possible attempt will be made to secure Britain's participation as a full member.

Such a step will, of course, expose British industry and commerce to the full blast of competition from the industries of Belgium, France, Italy, the Netherlands and West Germany—industries that have already made great progress under the stimulus of the Common Market. The efficient, well-organised producers will have nothing to fear and will gain the prospect of free access to a vast market. At the other end of the scale, a number of inefficient producers will doubtless suffer and may well go to the wall. The great majority of companies, however, will weather the transition period, emerging stronger and better able to cope with opportunities for expansion.

If in fact Britain becomes a full E.E.C. member on 1 January, 1963, then there is not much time in which to prepare for greater competition. But the British chemical industry, already the most progressive in the country, can be relied on to take the necessary steps. A number of companies have been doing this already, for to meet the economic conditions that have prevailed for the past year it has been vital that productivity should be increased and that new, more efficient processes should be developed.

In the meantime, the Chancellor should have second thoughts about some of the measures he has introduced to dampen home demand. These will add to manufacturers' costs, making more difficult the task of competing overseas; also they do nothing to encourage the investment that will be vital if British industry is to enter the Common Market.

In export markets, the chemical industry continues to expand its trade, but at a slower rate than last year. For the first half of 1961 chemical exports were worth £165.9 million, a 3.7% rise on the figure of £160 million recorded in the first half of 1960, when exports rose 12.4% over 1959. In the first half of this year, U.K. exports to the Common Market declined by 2%, while those to the European Free Trade Association rose by 10%. In January to June 1960 our exports to the C.M. rose by 21.2% over the previous year and it is already apparent that the increases in the E.E.C. external tariff have affected our trade with the countries concerned. On the other hand imports from the Common Market increased only slightly, while those from E.F.T.A., at £9.19 million, were up 7%.

Exports of chemicals to Commonwealth countries as a whole are down as are shipments to the U.S. Development of trade with the Soviet bloc, while doubtless holding good long-term prospects, was down considerably in the first half of 1961. Not until the U.K. chemical industry can export freely to Europe can it expect any dramatic increase in exports.

I.C.I. Take Initiative in New Polythene Price Cuts to Boost Sales

IN another bid to overcome competition from imports and to boost consumption, I.C.I. Plastics Division from 1 August cut the prices of their Alkathene polythene by 3d-4d/lb, depending on the grade. This follows a 4d/lb reduction made in November 1960. (From 1 July, I.C.I. cut the price of their Terylene staple fibre by 10d/lb).

Grade for grade, I.C.I. state their new prices are equivalent to those of any overseas producer and will enable U.K. converters to meet competition from low-priced imports. With total capacity for 105,000 tons/year, I.C.I. have capacity available to meet "a substantial increase in demand".

There has been a mounting sales drive on the part of the U.K. producers to help overcome surplus capacity in poly-

thene. At the beginning of this year, U.K. capacity totalled 147,000 tons; by the end of the year the figure will be 175,000 tons, with I.C.I. accounting for 105,000 tons, Union Carbide, 25,000 tons, Monsanto, 17,000 tons, Shell Chemical, 15,000 tons of high pressure material (B.A.S.F.) and an unspecified proportion of a 15,000 Ziegler polyolefin total, and British Hydrocarbon Chemicals, 13,000 tons. Early in 1963 Monsanto's expansion will be in full production, giving them a total of 25,000 tons and raising U.K. capacity to over 185,000 tons.

Imports of polythene resin in 1960 totalled 8,866 tons, compared with 9,674 tons in 1959. Of the 1960 total, 7,233 tons came from the U.S. and 1,633 tons from West Germany. U.K. exports of

polythene resin in 1960 totalled 52,000 tons, according to trade estimates.

The polythene oversupply position is world-wide and accounts for the high level of imports. In the U.S. consumption this year will, it is estimated, total 850,000 tons, compared with capacity estimated at 1.2 million tons. British producers are meeting stiff overseas competition not only in the U.K. but also in a number of this country's traditional export markets.

Of total free world production of low-density material, 45-46% goes into film use, 20-21% into general moulding, 11% into general and cable insulation, 7% into pipes; 7% into extrusion; 5-6% into blow moulding, with 3-4% for miscellaneous uses. In Europe it is estimated that consumption is between 60 and 70% of production capacity.

As CHEMICAL AGE went to press, it was announced by Monsanto Chemicals Ltd. that prices of their current range of virgin polyethylene were being reduced by 3d/lb., while certain moulding grades are being reduced by 4d/lb. Other polythene producers—Shell, Union Carbide and D.C.I.—are expected to announce similar price cuts.

B.D.H. Shareholders Over 80% in Favour of Mead Johnson Agreement

SHAREHOLDERS of British Drug Houses Ltd. have now approved the arrangements for a close link with Mead Johnson and Co., whereby the U.S. pharmaceutical concern will advance B.D.H. the sum of £5 million at 5% for 7½ years, plus certain trading advantages, in exchange for 35% voting rights in B.D.H. and appropriate representation on the board.

At a special B.D.H. meeting in London on 31 July, a resolution authorising the directors to go ahead with the agreement was carried by 57 votes to 41. At the start of the meeting the chairman, Mr. Geoffrey Eley, revealed that well over 80% of proxy votes received had been in favour of the Mead Johnson link, thus topping the 75% majority needed. However, a poll was demanded on a second resolution concerning the creation of 390,000 'B' ordinary shares needed to implement the agreement, and also on a third resolution amending the articles to provide for alternative directors.

Voting figures, subsequently released, showed majorities of 83% in favour of the Mead Johnson link, while the resolution to create the extra shares was carried by 2,781,658 votes against 567,420. On the resolution to amend the articles there were 2,789,967 votes for and 555,702 against.

The meeting culminated several weeks of lively opposition to the deal from a group of shareholders led by Mr. John Horn, chartered accountant, heightened by a merger offer from William R. Warner and Co. Ltd., U.K. subsidiary of the U.S. Warner-Lambert concern, and also by rumours of a possible takeover bid by another, unidentified company.

In a statement to B.D.H. shareholders following the Warners offer, Mr. Eley said this offer was wholly unacceptable

and described it as "in a sense, presumptuous". He said Warners was a business with which B.D.H. had little in common and which B.D.H. would only be interested in acquiring, if at all, on bargain terms. He then went on to show that the Warners offer was unattractive compared with that of Mead Johnson. Key points in his argument included:

In contrast with the unconditional £5 million offer of Mead Johnson, Warner-Lambert offered to "procure that loan facilities, at current interest rates, and on normal terms, will be made available . . . in such amounts as are agreed to be necessary and profitable". Such facilities, Mr. Eley pointed out, would be more expensive, especially today, than those offered by Mead Johnson even if they should be equal in amount.

Against the 35% stake in B.D.H.'s equity to be acquired by Mead Johnson, it appeared that Warner-Lambert would expect to receive something like a 50% stake.

While Mead Johnson offer B.D.H. the right to manufacture and sell any Mead Johnson pharmaceutical products in the British Isles and in most countries outside the U.S. and Central and South America, Warner-Lambert's offer was that B.D.H. could sell existing Warner-Lambert products, and new products subject to payment of reasonable royalties, but only in the U.K. and such other markets as might be agreed.

Further unattractive features of the Warners suggestion from the profits point of view were outlined by Mr. Eley, and he emphasised that if the deal should come to nothing, Warner-Lambert, which operates in the same overseas markets as B.D.H., would have been given information that could be used to B.D.H.'s disadvantage, whereas the information acquired about Warners' "would be of no conceivable use to us".

I.C.I./Robinson Join to Develop Plastics Film

A NEW joint venture between I.C.I. and E. S. and A. Robinson (Holdings) Ltd., Bristol, has the aim of developing the uses of plastic films in the packaging industry.

I.C.I. are subscribing for a minority interest in a new Robinson subsidiary to be called Robinson Plastic Films Ltd., which, together with other Robinson subsidiaries, will manufacture a wide range of plastics film products for the packaging industry. Robinsons are acquiring a minority interest in British Visqueen Ltd., an I.C.I. subsidiary that manufactures and converts polythene and other plastics films.

British Visqueen have a capital of about £21 million and Robinson's shareholding will be 33½%. The capital of Robinson Plastic Films is substantially lower than that of British Visqueen Ltd. and the I.C.I. shareholding will be 49%.

Both companies believe that the combination of I.C.I.'s manufacturing and research technique with Robinson's knowledge and experience of the packaging industry will lead to the widest development and most efficient production of plastics films, both old and new, for all packaging uses.

Batteries Take 20% of All Lead Consumed

Consumption of lead in batteries in the U.K. has been rising steadily and in 1960 the battery industry took some 75,000 tons of lead as metal and oxides—about 20% of all lead consumed.

Project News

S. and L. Hand Over Corby Tonnox Facilities to British Oxygen

● TONNAGE oxygen facilities of **Stewarts and Lloyds** at Corby, Northants, are to be handed over to the **British Oxygen Co. Ltd.** Stewarts and Lloyds were previously producing their own tonnage oxygen for their steel-making operations.

British Oxygen are progressively installing additional tonnage oxygen facilities to meet the oxygen requirements arising from the expanded steel-making operations.

The oxygen facilities at Corby can at present produce 200 tons a day. The capacity now planned is not revealed. The steel output of the Corby works is 1.1 million ingot tons a year. This is being expanded under a £35 million, five-year programme to 1.55 million ingot tons.

Scottish Board to Use B.P. Refinery Gas

● A PROJECT to connect the **Scottish Gas Board** works at Granton, Edinburgh, to the **British Petroleum** refinery at Grangemouth was announced last week. Work will begin soon on the £1 million project, which will carry oil refinery gas from Grangemouth in special pipelines the 21 miles to Granton where it will be refined, mixed with town gas and distributed.

400 Contracts Placed for Dragon Reactor

● By the end of March, 1961, over 400 contracts, valued at £4.3 million, had been placed on the high temperature Dragon reactor being developed by the Organisation for European Economic Co-operation. Contracts for research, development and equipment amounted to approximately £1.9 million (244), while £2.4 million (164) was spent on contracts for the reactor experiment itself.

Manufacture of the pressure vessel has proceeded satisfactorily and considerable progress has been made in finalising the design of the core.

B.H.C. Butadiene

● THE first butadiene plant at Grangemouth of **British Hydrocarbon Chemicals Ltd.** was built by **Kellogg International Corporation** and not by Stone and Webster Engineering Ltd. as stated in **CHEMICAL AGE**, 15 July. The second butadiene plant at this site was constructed by **Fluor Engineering and Construction Co. Ltd.** The styrene monomer plant of **Forth Chemicals Ltd.** at Grangemouth has had 8,000 tons/year added to

Progress of the £3 million expansion scheme of **Laporte Titanium Ltd.** at Stallingborough, Lincs, is shown by this recent photo of the site. The extensions will increase annual production of titanium oxide from 30,000 to 50,000 tons by 1962



existing capacity of 42,000 tons/year, making a total of 50,000 tons.

Neckar Water Treatment Plant for Basra

● WATER treatment for the new Iraqi power station at Basra is being handled by the **Neckar Water Softener Co. Ltd.**, Artillery House, London S.W.1, members of the **Aberdare Holdings Group**. Pre-treatment equipment has been installed to deal with 15,000 gall. of river water per hour. Plant so far installed for second-stage treatment handles 7,500 g.p.h., of which 5,000 are filtered for general auxiliary services, the remainder being first softened with lime, then filtered and subjected to base exchange treatment before passing to evaporators.

Joint Polypropylene Film Venture for Shell, Metal Box

● A FACTORY for the manufacture of polypropylene film and film products is to be built in the U.K. as the result of an arrangement, already agreed in principle, between the **Metal Box Co. Ltd.** and **Shorko**, a joint venture between **Shell** and **National Distillers and Chemical Corporation** of the U.S. It is proposed that a joint company should be set up and the venture is reported to involve an investment of several million pounds. Principle end-uses envisaged for the film produced are the packaging of food and clothing.

Purpose of the new venture is to explore additional outlets for plastics film, particularly polypropylene. The announcement came only 24 hours after the news that **I.C.I.**, who also manufacture polypropylene, are to form a link with **E. S. and A. Robinson** in the development of packaging uses of plastics film (see p. 188).

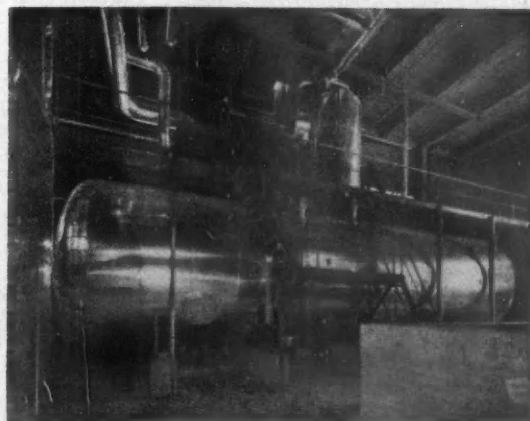
Light Oils Duty Will Raise Production Costs

THE Chancellor's decision to increase by 10% the duty on light hydrocarbon oils will "raise the cost of production of a wide variety of products including, paint, rubber, plastics and as well as dyeing and cleaning". This is stated by **Mr. Norman Campbell**, chairman of the **Industrial Light Oils Committee**, which represents 13 national trade organisations.

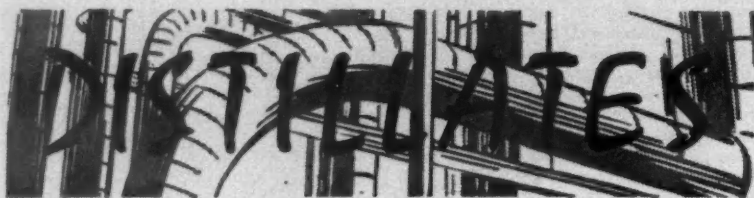
Mr. Campbell adds that the industrial oils used in these industries are subject to the same rate of duty as motor fuel. Export trade of the industries concerned will also be adversely affected.

High First Quarter Capital Spending Rate

Fixed capital spending in the U.K. chemicals and allied industries in the first quarter of 1961 totalled £44.7 million, £6.8 million up on the first quarter figure of 1961 and the same as for the last quarter of 1960.



De-aerator at the new Finnish paper mill at Heinola was designed by **William Bobby and Co. Ltd.**, Rickmansworth, Herts. The storage tanks holds a 30-minutes supply of water, 175,000 lb. Above it is the de-aerator dome



★ THERE can be no doubt that the Soviet Exhibition in London, which closed last week, like the British Trade Fair in Moscow, was a great success. Mr. A. G. Tikhonov, deputy head of the Soviet Trade Delegation states that orders taken by Soviet trade organisations at Earls Court were worth more than £18 million.

I am told that orders taken for chemicals were valued at about £500,000 for supply during 1961. Items dealt in were mainly aniline oil (despite a 33½% import duty, which it is hoped will be reduced next year), diethylamine, potassium carbonate, gum rosin, carbon blacks, particularly lamp black and thermal carbon black. One large U.K. company is currently studying Soviet diphenylamine prior to placing a large order.

Hydrogen peroxide was also the subject of a large order, but import duty is presenting some difficulty. It is hoped to increase trade in radioactive isotopes, in which a number of firms were interested.

Altogether, the Soviet commercial section of the fair, which was extremely busy when I called, met more than 20 British chemical companies. Negotiations are in hand on process licensing with I.C.I., Vickers, and other companies.

In any event it is disappointing after the promise of last year that Britain's chemical exports in the first half of 1961 to the U.S.S.R. should have fallen to £1.96 million from £3.30 million. On the other hand, imports of chemicals from the U.S.S.R. in the same period were almost doubled at £601,066.

★ I LEARN that an unnamed French professor is to visit India shortly to advise the Government there on the development of a petrochemical industry. According to Mr. K. D. Malaviya, Minister for Mines and Oil, the petrochemical industry would develop in the next 20 years in such a manner that could never be envisaged by the private sector of Indian industry.

Instead of developing the industry "in a piecemeal manner with different small units for the production of different products as is being done in the private sector", the Indian Government is now thinking in terms of a huge integrated unit which would manufacture all the products desired. Such a policy is expected to result in considerable economy.

★ THE establishment of a permanent Office of Science and Technology within the office of the President was one of the recommendations of the U.S. Senate Sub-Committee on National Policy Machinery. It is proposed that the new office should be headed by the President's

science advisor, staffed by several special assistants and would continue to use the President's Science Advisory Committee and *ad hoc* panels of scientists for advice.

The new unit should have statutory authority to make recommendations for meeting long range national needs in science, and to serve as technical advisor to the Budget Bureau on science budgets.

To give the new office such authority would mean the transfer of the National Science Foundation's planning and evaluation responsibilities to the new unit and would, therefore, require an amendment of the statutes and executive orders relating to the N.S.F. The sub-committee requests the President to use his powers under the Re-organisation Act to submit a plan to establish the science office to Congress by January 1962.

★ THE Dead Sea Works Ltd. will, when their bromine extension is operating early next year, raising output from 2,900 tons to 10,000 tons a year, be one of the world's major producers. Plant will be operated by the subsidiary, Dead Sea Bromine Co. Ltd. who hold 50% of the capital of Bromine Compounds Ltd., who by April next will have methyl bromide and other organic and inorganic bromides in production.

Apart from the 50% interest of Dead Sea Bromine in Bromine Compounds, shareholdings of 25% each are held by F. W. Berk and Co. Ltd. and Metal and Rohstoff AG, Switzerland. D.S.B. also hold a 50% interest in Prodotti del Medio Oriente S.p.A., who market their products in Italy.

Expansion plans of Dead Sea Works already total £128 million and, at a later date, the company will spend a further £25 million on additional expansion projects. Current projects include expansion of potash output from 150,000 t.p.a. to nearly 600,000 t.p.a.; a new 75,000 t.p.a. magnesite plant and a new salt unit. Most of the additional bromine will go for ethylene dibromide production.

★ THE second Chemical and Petroleum Engineering Exhibition, to be held at Olympia next June, is being organised by F. W. Bridges and Sons Ltd., whose founder, Frederic Bridges, was responsible for the first International Chemical Engineering and Industries Exhibition at the old Agricultural Hall, Islington, in May 1911. In those days both chemical and petroleum engineering were in their infancy and regarded more as offshoots of conventional engineering than as industries in their own right.

The impetus of two world wars and the demand for new materials has changed all that. Not only are chemical

and petroleum engineering important industries in their own right they have been making a growing impact on most other industries and on the new space technology.

Capital spending by the U.K. chemical industry over the past ten years has been in the region of £1,300 million, while world consumption of petroleum products has been doubling itself every 12 years. More than £120 million worth of petroleum equipment is now made in Britain each year. The results of all this expanding activity will be shown at Olympia. While it is too early to say what new trends may be shown a study of recent undertakings by U.K. chemical and petroleum engineers may give a clue. These include pipelines of increasing dimensions; synthetic rubber plants for the U.S.S.R., Australia, India and the Netherlands; refinery equipment or complete refineries for Denmark, Turkey, Spain, Mexico, Brazil, El Salvador, Panama, Iraq and the Philippines; sulphuric acid units in Yugoslavia and Rumania; vegetable oil plants for India; urea plants in Mexico and Poland.

★ CUTTING road verges by normal methods is slow and costly but by using a development of Baywood Chemicals Ltd., 37-41 Bedford Row, London W.C.1, a saving of 50% in labour costs is claimed.

The successful control of grass and weeds on road side verges was demonstrated in Gloucestershire recently where Baywood have established trial plots. It is found that by using a mixture of materials, a combined spraying operation can be carried out for overall control of grass and weed growth.

The mixture used contains maleic hydrazide, a product of Whiffen and Sons Ltd., in the form of a water-soluble amine salt together with a selective weed-killer of Baywood's called Vergemaster. Vergemaster is 2,4-D acid in oil emulsion for the selective control of broadleaved weeds.

★ AN electron accelerator for the production sterilisation of surgical dressings, plasters, etc., has been purchased by Smith and Nephew of Hull, from High Voltage Engineering of Burlington, Mass. The installation of this 4 million-electron volt, 4 kW accelerator will be the first in-plant use of machine radiation for pilot production outside the U.S.

The accelerator will direct a beam of electrons through a 15 in. scanner, sterilising the pre-packaged product on a conveyor line. A Smith and Nephew research and development programme led to the decision to use machine radiation in favour of radioactive sources.

The accelerator will have a capacity of about 600 lb./hour and will be installed and serviced by High Voltage Servicing Co. Ltd.

Alembic

Warren Spring Laboratory Report

Revised Chemical Engineering Research Programme Includes Work on Catalysis

IN line with the recommendations of the Wilson Committee on Coal Derivatives (see *CHEMICAL AGE*, 20 August 1960, p. 283) the Warren Spring Research Laboratory at Stevenage is winding up the technological work on the Fischer-Tropsch process for oil synthesis.

The Annual Report (published by the Department of Scientific and Industrial Research and available from H.M.S.O. at 3s) states that the Laboratory has agreed to a revised research programme in chemical engineering and process development which includes work in the general field of catalysis and reaction systems. The Laboratory has also agreed that it should keep in touch with developments in the general field of oil-from-coal research through the literature and by personal contacts and visits.

In view of the fact that no workers have yet been able to establish a clear relationship between electrical properties of a solid and catalytic activity, the Laboratory has started a more thorough study of this problem.

Iron Oxide Catalyst

The system chosen for investigation is iron oxide (Fe_2O_3) containing small concentrations of titanium dioxide. The titanium ion can exist in the haematite lattice without introducing strain, and the electrical properties of this system have been extensively studied by other workers. The addition of an atom of titanium has the effect of converting one ferric ion to ferrous, thus reducing resistivity. Further, the presence of ferrous ions would be expected to affect the ability of the solid to absorb gases. Measurements of resistivity and thermoelectric power are being carried out.

In seeking a quantitative relationship, it is important to establish that the titanium is completely incorporated in the lattice. Much of the work during 1960 has been concerned with the preparation and characterisation of samples.

Measurements of electrical resistivity have shown that titanium begins to diffuse into the haematite lattice at about 700°C, but there are indications that a temperature of about 1,320°C is necessary for complete incorporation.

Identifications of the gases which are evolved when iron oxide is heated has shown that at a temperature up to 600°C only carbon dioxide and water appear, while a large loss of surface takes place. Thus a substantial fraction of the original surface is covered by adsorbed carbonate and hydroxyl ions. No evidence of oxygen evolution can be obtained. It has been found, however, that about half the oxygen on the sur-

face of an iron oxide incorporating titanium can be desorbed and readsorbed in a reversible manner at 750°C and a study of the relationship between electrical properties and reversible oxygen adsorption has been started.

One of the reasons for setting up the Warren Spring Laboratory was to provide central facilities that would be available to other Government departments and to industry on a repayment basis. It is reported that these facilities are being used to an increasing extent.

A strong interest in rare earth metals has been encountered among certain firms engaged in mineral processing and

extraction and the Laboratory has therefore revised the availability and possible uses of these metals. As a result of the review they have recommended to the Research Council that research on alloys containing individual rare earth metals is desirable and should be encouraged.

Among sponsored work being undertaken by the Chemical Engineering and Process Development Department are studies on the viscosity of polymers and solution rates of gases.

During the year research was also carried out into the surface chemistry of fuel cells on behalf of the National Research Development Corporation.

Computer Control for Big New Texas Plants of Monsanto, Celanese

FURTHER evidence of the progress being made in the application of electronic computer control techniques to chemical operations in the U.S. is provided by orders for computer systems that have been placed with the American associates of Honeywell Controls Ltd. by Monsanto Chemical Co. and Celanese Corporation of America.

The Monsanto order is for four digital computers, at an undisclosed cost, to be used for on-line control computation in the company's multi-million-dollar hydrocarbon raw materials plant currently under construction at Chocolate Bayou, Texas, which will include the world's largest ethylene unit. Honeywell are also providing a full complement of electronic instruments. The plant will operate initially on an open loop, with the computers continually monitoring process conditions, making calculations, and furnishing printed instructions to operating personnel who will then make necessary process changes.

Using these computers, Monsanto expect to achieve significant savings through minimum utility cost, optimum yield improvements and consistently high product quality. Monsanto have been prominent in trying out computer control techniques for various operations and have an in-line computer controlled ammonia plant at Luling, La., based on a feasibility study undertaken jointly with another instrument company, Thompson-Ramo-Woodridge (C.A., 10 Dec. 1960, p. 994). Monsanto have also made some use of a mobile data logging unit to solve process control problems on certain of their plants.

The order from Celanese Corporation is for a computer-directed control system for their acetyl manufacturing plant

being built at Bay City, Texas, also at a cost of several million dollars. The integrated system will perform on-line monitoring and control of a new process for producing acetaldehyde. The system embodies a Honeywell R290 computer—a powerful high-speed digital type—and will include compatible electronic instrumentation, a computer programming console, a centralised instrument board, an alarm printer and other equipment.

In the initial phases of production, only a limited amount of the process will be controlled by the computer. As more operating information becomes available, additional control loops are expected to be placed under computer direction. Also to be under computer control is the production from acetaldehyde of 2-ethyl hexanol. The computer system will monitor input signals of flows, temperatures, pressures, liquid levels, specific gravities and other process variables at a maximum scanning rate of 200 points per second. Key variables will be logged by electric typewriters along with calculated values of production rates, yields, efficiencies, material balances and other engineering information.

The new acetaldehyde process uses ethylene gas and oxygen as raw materials instead of a mixture of other petroleum gases. The process has been licensed to Celanese by Aldehyd GmbH, a German company owned jointly by Farbwerke Hoechst and Wacker-Chemie. The Bay City plant is scheduled to go on stream in 1962. It will enable Celanese to produce more than 500 million lb. of acetyl chemicals annually by three different processes, each using different raw materials as feed stocks.



J. Arthur Reavell, president, with Mrs. Reavell, unveiling the Tantiron plaque at the new Greenhithe Works

Kestner Make First Stage of Move to Works at Greenhithe

NEW foundry of Kestner Evaporator and Engineering Co. Ltd. at Greenhithe—first part of a complete move of the company's works from New Cross—has been brought into production. At a recent ceremony, Mr. J. Arthur Reavell, president of the company, unveiled a Tantiron plaque to inaugurate the opening of the foundry.

Other shops that will be transferred are the Keebush production and machine shop, grinding, pump assembly and test, Keeglas and p.v.c. fabrication, general plant erection and heavy plant erection and finally the general laboratory pilot plant and test laboratory. A new drawing office is being built to house 60 draughtsmen. On completion the factory floor area will total some 100,000 sq. ft. The whole move will be completed in about six months.

The new foundry is making castings of Tantiron, the company's acid resisting silicon iron, and lead alloy resisting castings. Five furnaces have been installed giving an output of 10 tons of Tantiron castings a week. There is space for this output to be doubled.



The Tantiron foundry showing four of the five furnaces for casting Tantiron. The castings are mainly of acid-resisting pump parts which are used by acid producers throughout the world

Shell to Build £2 M. Plant for Range of New Organic Acids

A NEW group of organic acids, developed by Shell International Chemical Co., after extensive research in their Amsterdam laboratories, are to be produced on a commercial scale in January 1962 in a £2 million plant now under construction at Pernis, Rotterdam. The acids are already being produced in a pilot plant and are available under the trade name, Versatic.

The acids are produced from olefins, carbon monoxide and water by a process developed by Shell from the original work of Dr. H. Koch of the Max Planck Institut fuer Kohlenforschung at Muelheim in the Ruhr area of Germany.

It is expected that eventually a full range of Versatic acids will be made available. The present samples, however, and the acids that will be in full production in 1962, are a blend of C_8 , C_{10} and C_{11} mono carboxylic acids. The acids are fully saturated and highly substituted on the carbon atom adjacent to the carboxyl group. There are no acids present having two alpha hydrogen atoms, and only 10% containing one alpha hydrogen atom. Some cyclic material occurs among the remaining 90% of the product which has no alpha hydrogen atom.

In some respects Versatic acids are similar to other organic acids already on the market, but Shell say that they possess unique properties which will find important applications in the surface coating, plastics, rubber, metallurgical and other industries.

The value of the high degree of branching of the acids lies in the great stability against hydrolysis of the esters which can be made from them. This makes such esters of interest as plasticisers. Resins based on Versatic acids are expected to possess exceptional chemical stability.

The products as marketed contain 93% acid (the remaining being neutral oil), are colourless and almost odourless. An obvious application for such acids is for high quality, low colour, low odour paint driers. There is an increasing demand for such driers.

Research into applications and pro-

ducts derived from Versatic acids is currently being undertaken both in Shell laboratories and in those of potential customers. Fields of interest include emulsifiers for rubbers and plastics, plasticisers, foam promoters, wood preservatives, and amines and amides.

The pilot plant at Amsterdam will continue in operation to provide Versatic acids for such research and to enable companies to carry out small-scale trials.

U.K. Chemical Exports Up in First Half of 1961

In the first half of 1961, British exports of chemicals and allied products totalled £165,901,286, a rise of 3.5% on the same period of 1960 when the total was £160,024,861. Over the same period imports of chemicals were valued at £87,574,529, showing a slight increase over the 1960 period when the total was £87,491,211.

The following is a break-down of the half-year results so far as trade with the Common Market and the European Free Trade Association is concerned:

U.K. TRADE WITH C.M.

	Exports		Imports	
	1960	1961	1960	1961
	£ million		£ million	
Belgium ...	3.57	3.73	2.34	2.23
France ...	4.13	4.78	7.97	8.34
Holland ...	7.92	7.63	6.90	7.44
Italy Q... ..	5.73	5.67	3.61	3.61
W. Germany	6.19	5.23	14.34	13.74
Totals ...	27.54	27.04	35.16	35.36

U.K. TRADE WITH E.F.T.A.

	Exports		Imports	
	1960	1961	1960	1961
	£ million		£ million	
Austria ...	0.70	0.94	—	—
Denmark ...	2.91	3.34	0.50	0.53
Norway ...	2.84	2.73	2.26	2.04
Portugal ...	1.86	2.08	0.51	0.83
Sweden ...	5.40	5.94	1.57	1.62
Switz. ...	2.09	2.36	3.76	4.17
Totals ...	15.80	17.39	8.60	9.19

Gas Industry Increases Crude Benzole Output

OUTPUT by the gas industry of crude benzole in the year ended 31 March totalled 25.8 million gall., a rise of 5.7% on the previous year's figure of 24.4 million gall. Crude tar made in the year totalled 1,659,000 tons, a fall of 3.5% on the previous total of 1,720,000 tons. Total make of coke, at 9,667,000 tons, was down by 1.9% on the 1959-60 figure of 9,888,000 tons.

Total gas made and purchased, at 2,890.2 million therms showed a rise of 2.6%. Gas industry consumption of materials for gas making was as follows:

	'000 Tons	%
Coal carbonised	21,983	22,265 -1.3
Coke for water gas	1,282.0	1,344.3 -4.6
Million Gall.		
Oil for water gas	148.6	163.1 +9.8

MERSEY RIVER BOARD CITES GERMAN PROGRESS IN COMBATING POLLUTION

THE German river authorities have powers to carry out anti-pollution measures and on one of the most polluted rivers (the River Emscher) there are already three river treatment plants run by the Emscher River Association, a statutory River Board. Such schemes, of course, cost much money, but at present the River Boards in Britain have no powers to spend money on river treatment works. There is little doubt that with such special powers, much more could be done, and more quickly, to reduce the heavy load of organic pollution in such industrial rivers as the Irwell and Mersey. This would require the passing of a special Act of Parliament to enable the Board to finance large river treatment schemes," observes the annual report for 1960/61 of the Mersey River Board.

The report notes that "the battle against pollution continues unabated. There is an atmosphere of conviction that it is being won, if slowly. While major successes can be counted on the hands, outright failures have been insignificant. There are small advances over a wide front.

Much Progress Afoot

"The defined enemies are sewage pollution and trade effluent pollution. In human terms the Board's endeavours to remove sewage effluent pollution are effected with the close collaboration of the vast majority of the members and staff of the local authorities. Instances of tardiness, perhaps of indifference, though irritating, are few. Much progress is afoot, and speeded by the now almost complete relaxation of Government restrictions on capital expenditure which have for nearly two decades prevailed. As to trade effluents there are, of course, technological factors which retard advance. Several effluents—caustic liquors, resinous textile works, phenolic gas works, effluents and tar distillery discharges—are intractable. There seems a need for further research and work-scale trials; and maybe a case for power to purify the rivers," adds the report, indicating certain lines for purification, in an earlier section.

"Perhaps too there is a need for some traders to make a rather more energetic response to the developing public sensibility of the poor state of many of our rivers and to the general will for securing within the bounds of what is practicable the greatest improvement in the shortest possible time. There are just a sprinkling of manufacturers who are inclined to think in disregard of their responsibilities to the community. And there are still too frequent excuses of the nature, 'we are sorry the plant was producing such poor results when the

inspector called; the man who normally looks after it has been away ill'. Would matters have been allowed to drift if the man had been on the production line?"

Reference is made in the report to the Board's officers and officers of the Widnes Corporation considering outline plans for reconstruction of the sewerage and sewage disposal system of Widnes. The district is one of the most important U.K. centres of heavy chemical manufacture, and the present drainage system is complicated in the extreme, with many old sewers and some of the drainage works in doubtful condition.

There are associated complex problems for the Board and the Corporation of sewage and trade effluent disposal on the one hand, and flood prevention on the other. Existing sewage disposal, for example, is largely by untreated dis-

charge from numerous outfalls to the estuary of the Mersey. The Corporation is calling in both engineering and chemical consultants to advise them on comprehensive proposals for the new sewerage and sewage disposals works.

The Report contains many examples of new schemes in preparation or being carried out for improving effluents: these include The Holden Vale Manufacturing Co. Ltd., a branch of the Bleachers' Association; the Newton Bank Print Works of the Calico Printers' Association at Hyde; and Walkden Makin and Co. Ltd., rayon dyers, Openshaw, Manchester.

At Walkden Makin and Co., consultants have been called in to carry out experiments and install a pilot-scale plant by which they hope to reduce the oxygen demand.

Canadian Tariff Board Fixes Dates for Further Hearings on Chemicals

DETAILS of further public hearings in connection with its enquiry into tariff items covering chemicals have been issued by the Canadian Tariff Board. At a hearing in Ottawa on 22 January next, the Board will consider amine function compounds, single or complex oxygen-function amino compounds, and quaternary ammonium salts and their hydroxides, including lecithins and other phosphonaminolipins. Other hearings have been fixed as follows:

26 February: Amide-function compounds; parphenetidin; urethane and methyl pentanal; imide-function and imine-function compounds; nitrile-function compounds, diazo-, azo, and azoxy-compounds; organic derivatives of hydrazine or hydroxyl-amine; compounds with other nitrogen functions.

12 March: Organo-sulphur compounds; organo-arsenic compounds; organo-mercury compounds; other organo-inorganic compounds.

26 March: Heterocyclic compounds, including nucleic acids; sulphonamides; acetylsulphamethazine and acetyl acetone and other materials for use in the manufacture of sulpha drugs.

30 April: Provitamins and vitamins; nicotinic acid; hormones; chemicals for use in steroid derivatives; enzymes; glycosides; vegetable alkaloids; cocoa residues; sugars; antibiotics; and chemicals for use in the manufacture of antibiotics, bacteriologicals, hormone products and biologicals; other organic compounds.

14 May will be devoted to end-use tariff items, including: calcium chloride for road treatment; crude bromides for bromine; materials and parts, entering into the cost of calcium cyanide,

potassium cyanide and sodium cyanide; materials for chromium oxide; chromium trioxide and other materials for the production of tinplate; chloroform, ethylchloride and preparations of vinyl ether for anaesthetic purposes; hydrolysed animal matter; surgical suction apparatus; platinum retorts, etc., for production of sulphuric acid; crude glycerine imported for refined glycerine.

Lists of examples of the products that come under the general headings mentioned above, and other information on the hearings are given in the *Board of Trade Journal*, 28 July, p. 218.

In Parliament

Alkali Acts May Cover Additional Processes

The Minister of Housing and Local Government is considering extending the Alkali Acts by order to cover certain additional processes where control is now on an informal though satisfactory basis. The processes under review are not specified, but in the House of Commons last week Sir Keith Joseph, Parliamentary Secretary to the Minister, said that the staff of the Inspectorate in England and Wales had increased from 10 in 1956 to 21 today.

Asked if he was satisfied that the staff, despite this increase, was likely to be sufficient to cope with the big increase in chemicals production, Sir Keith said it must be remembered that a number of processes were being converted to smokeless techniques and that a number of other undertakings, notable gas and coke, were concentrating in fewer hands.

B.A. Annual Meeting

SPECTROSCOPY WILL BE THEME OF CHEMISTRY SECTION MEETINGS

MAIN theme of Section B—chemistry lectures at the annual meeting of the British Association for the Advancement of Science, to be held at Norwich from 30 August to 6 September, will be spectroscopy. All chemistry section meetings will be held at Hewett School, Hall Road, Norwich. Local secretary is Mr. S. Treet, City of Norwich School, Eaton Road, Norwich.

Section B presidential address will be given by Professor R. G. W. Norrish, F.R.S. Professor of Physical Chemistry, Cambridge, on 'Chemistry and spectroscopy' on Thursday, 31 August. Other Section B papers will be given as follows:

31 August—Professor R. A. Morton, F.R.S., Professor of Biochemistry, Liverpool University, on 'Spectroscopy as a biochemical tool'.

1 September—Dr. Norman Sheppard, assistant director of research in spectroscopy, Cambridge University, 'Chemical studies in the infra-red'; Dr. A. Menzies, controller of research, Hilger and Watts Ltd., 'Analytical and industrial applications of spectroscopy'.

4 September—Dr. T. M. Sugden, reader in physical chemistry, Cambridge, 'Molecular structure and reactivity as revealed by microwave and radio-frequency spectroscopy'; Dr. A. B. Callear, demonstrator in physical chemistry, Cambridge, 'Absorption and emission spectroscopy of explosive reactions with special reference to knock and anti-knock in the internal combustion engine'.

Darwin Lecture

In addition to these lectures, Dr. Judith Milledge, lecturer in crystallography, University College, London, will give the Darwin lecture on 4 September on 'Form and colour in nature', while there will be a discussion on the training of industrial food scientists and technologists in the U.K. on 5 September. Sir Herbert Broadly, U.N.I.C.E.F. representative, will give an introduction to be followed by Dr. J. S. Mounfield, principal, National College of Food Technology, Dr. J. W. Corran, chief chemist of J. and J. Colman Ltd., Norwich, and Professor J. Hawthorn, Professor of Food Science, Royal College of Science and Technology, Glasgow.

In Section A (physics) on 4 September, Dr. E. G. Michaelis, European Organisation for Nuclear Research, Geneva, will talk on 'The new particles'.

Annual dinner of Section B will be held at the Royal Hotel, Norwich, on 1 September at 7 p.m.; the charge is £1 1s.

Scientific films to be screened are: 'Biological control of insects' (C.S.I.R.O., Australia); 'An introduction to ion exchange' (Permutit Co. Ltd.); 'Evaporation control' (C.S.I.R.O., Australia); 'The balance and its uses' (I.C.I.); 'The manufacture of glass' (Pilkington Brothers Ltd.); 'Electron microscopy' (A.E.I.); 'Extinguishing solid propellant fires' (Ministry of Aviation); 'Sensitivity of explosives' (U.S. Army); 'Part II—Atomic energy' (A.E.R.E.) These films will be screened at the Noverre Cinema, Theatre Street, Norwich.

This year's B.A. president, Sir Wilfrid Le Gros Clark F.R.S., Professor of Anatomy, Oxford, will give the presidential address on 'The humanity of man' at 8 p.m. on 30 August in St. Andrew's Hall, Norwich.

Full details of the meeting can be obtained from the secretary of the association at 18 Adam Street, London W.C.2.

New Complete Food In Biscuit Form

A NEW complete food in the form of cream filled biscuits is being produced by Leas Cliff Products Ltd., of Folkestone, a subsidiary of Pfizer's. Six of the biscuits—known as Limmits—together with a pint of milk a day provide all the protein, fat, carbohydrate, vitamins and minerals necessary.

A complete food, Complian, is also produced by Glaxo (see CHEMICAL AGE, 21 January 1961, p. 144) but this was developed primarily for hospital patients and is taken in the form of a liquid. Limmits have been developed as an aid to slimming and, although they are more expensive than Complian (3s 11d for six), they have the advantage of convenience.

Each Limmit biscuit contains 175 calories. Vitamins are dispersed in a vegetable fat which forms a cream and the biscuit itself contains whole meal and soya flour to increase the protein together with methyl cellulose to prevent a feeling of hunger. The biscuits contain no appetite depressant drugs.

Coal Conference in U.K.

The next International Conference on Coal will be held in 1963 at the Town Hall in Cheltenham on 28-30 May. This is the first conference of its kind to be held in the U.K. Communications should be addressed to Mr. R. G. J. Kingsmill, N.C.B. Research Establishment, Stoke Orchard.

International Scientists Discuss Polypeptides at Wisconsin

MAN-MADE polypeptides may yield synthetic vaccines to fight virus diseases. They have halted the growth of cancer in mice and they are capable of killing some of the most stubborn fungus diseases attacking human beings. These aspects and many others of polypeptides and polyamino acids were the subject of a meeting of scientists of many nationalities which was held recently at the University of Wisconsin.

Among other practical possibilities for these versatile chemicals discussed at the meeting were their use as plasma extenders to replace blood in transfusions and the possibility of cloth made from synthetic polypeptides which would resemble wool or silk more closely than any of the synthetics made today.

The international symposium, however, was organised for the more basic purpose of outlining and considering the important problems involving polypeptides and discussing methods now available for attacking such problems.

One of the intriguing things about polypeptides is their resemblance to proteins. This leads workers to believe that they can use polypeptides for simple models of proteins. They can control the structure of polypeptides and work with much less complicated models than proteins.

By using polypeptides put together in

various fashions, it may be possible to study the relation of the structure of protein to its function. For instance, a certain structure characteristic of protein may endow it with antibiotic properties, or structure study may throw some light on protein solubility problems.

Of the polypeptides tested for biological activity, at the University of Wisconsin, polyllysine has shown anti-tumour, anti-fungal and anti-bacterial activity. Recent findings illustrate more definitely some of the promise these man-made polypeptides may have for the control of disease.

Laporte Lose Case Against Du Pont Peroxide Patent

The Court of Appeal in London has rejected a submission by Laporte Chemicals Ltd. that letters patent held by E.I. Du Pont de Nemours, U.S., in connection with an improved process for manufacturing hydrogen peroxide should be revoked. This reverses a court decision of last year. Laporte's objection to Du Pont's proprietorship of the patent was based on the allegation that the process was invented in Germany during the war and therefore became public property under the Patents and Designs Act 1946, Section 4(1). Du Pont's appeal was allowed with costs.

WORLD SURVEY OF ESSENTIAL OILS—I

Production, Consumption, Imports and Exports

THIS survey is concerned with the production, consumption, imports and exports of the following materials: Geraniol and its esters, citronellal, citronellol and its esters, hydroxy-

By
A Special Correspondent

citronellal, linolol and its esters, citral, the ionones and methyl ionones and menthol (natural and synthetic). The data cover Australia, Canada, France, Great Britain, Italy, Japan, the Netherlands, Switzerland, United States, and Western Germany.

In general, official figures of production

(and sales) are only available from the U.S. records for that country and it has therefore been necessary to use indirect and inferential methods for obtaining comparative data for other territories. This has been done by a number of different methods such as deductions from imports and exports of the parent of essential oils from shipping figures, combined with a general knowledge of average extractions of the above isolates, soap consumption, etc. Many cross checks have been made. In spite of one or two notable exceptions, the correspondence has been remarkably good, sometimes 5% of each other and rarely greater than 10-12% apart.

The first part of this survey concerns Italy, Canada, the Netherlands and Great Britain.

Imports* of Certain Essential Oils and Menthol (U.K.)

Material	(Metric Tons) Corresponding isolates	1957
Citronella Oil	Geraniol (35%) Citronellal (50%) G.P.I. of PRC	509 135** 2232
Palmarosa Oil	Geraniol (90%)	12
Bois de Rose Oil	Linalol (85%) G.P.I. of PRC	62.4 2232
HO(FH 12) Oil	Linalol (80-90%)	3
Lemongrass Oil*	Citral (75%) G.P.IV of PRC	279 2232
Menthol	—	Total 745 Synthetic figure not available

* Retained after allowing for Re-exports.

** Includes that for Vitamin D and also used directly for soap manufacturers.

Source: Board of Trade and Tropical Products Institute unless otherwise stated.

Aromatics Consumption (Canada)

	(Metric Tons)	1954	1956	1958	1959	1960*
Geraniol**	3-4	2	2-3	3.5	4	
Citronellol**	1	<1	<1	1	1	
Hydroxy citronellal	1	<1	<1	1	1	
Linalol	1½	1	1.5	1.5	1-2	
Linalyl acetone	1½	1	1	1.5	1	

* Provisional ** Inc. esters

Imports of Essential Oils (Canada)

Material	(Metric Tons)	1955	1956
Citronellal oil	...	21	21
Palmarosa oil	...	—	—
Ho (or Ho-Sho)	...	—	—
Bois de Rose (or Rosewood) oil	...	13	14
Lemongrass oil	...	—	—
Citronella oil	...	£7,500 @ 12/6 lb.	£7,500 @ 10/- lb.
Bois de Rose oil	...	£4,700 @ 30/- lb.	£5,000 @ 25/- lb.
		2 m/tons	2 m/tons

Natural and Synthetic Menthol (U.K.)

	(Metric Tons)	1954	1956	1958	1959	1960*
		P E C	P E C	P E C	P E C	P E C
Natural	67 22 64.8	40.9 13.6 27.3	53 13 40	60 20 40	62 21 41
Synthetic	20 2.6 22.6	20 4.7 24.2	25 5 30	22 5 17	20 5 15

P=Production I=Imports E=Exports C=Consumption * Provisional

Essential Oils in U.K.

	(Metric Tons)	1954	1956	1958	1959	1960*
		P E C	P E C	P E C	P E C	P E C
Geraniol	78 8 70	62 7 55	80 8 72	70 8 62	52 — —
Geranyl Esters	9 — 9	8 — 8	6 — 6	6 — 6	4 — 4
Citronellal	1-2 — 1-2	3-4 — 3-4	4 — 4	3 — 3	4 — 4
Citronellol	24 4 20	18 3 15	22 5 17	24 6 18	20 10 10
Citronellyl Esters	5 — 5	3-4 — 3-4	3 — 3	4 — 4	3 — 3
Hydroxyl Citronellal	20 4 16	10 2 8	34 8 26	30 8 22	25 5 20
Linalol	15 2 13	32 4 28	14 3 11	16 5 11	14 5 9
Linalyl Acetate	19 3 16	33 5 38	26 2 24	28 7 21	20 5 15
Citral	15 7 8	38 28 10	31 19 12	25 15 10	25 14 11
Ionones	10 2 9	26 3 23	28 8 21	32 10 22	28 10 18
Methyl Ionones	7 1 6	17 2 15	20 1 19	20 2 18	21 3 18

P=Production E=Exports C=Consumption Imports of isolates etc. negligible * Provisional

Production/Consumption** of Aromatics (Italy)

	(Metric Tons)	1954	1956	1958	1959	1960*
Geraniol	6	9	7	8	8
Citronellol	2	3	3	2.5	2
Hydroxy citronellal	2-3	4	3-4	3	3
Linalol	—	1	1	1	1.5
Linalyl acetate	—	1	1	1	1
Citral	2	1	1.5	1	1
Ionones	4	2	2	3	2
Methyl ionones	5	3	3	3.5	3
Menthol (all grades)	19	17	25	2.2	20-25

* Provisional ** Imports and Exports negligible and/or self cancelling

Production/Consumption of Aromatics (Netherlands)

	(Metric Tons)	1954	1956	1958	1959	1960*
		P E C	P E C	P E C	P E C	P E C
Geraniol (inc. ex Palmarosa)	...	71 46 25	63 39 24	60 40 20	55 37 18	58 42 16
Citronellol	24 14 10	22 14 8	21 11 10	17 10 7	17 11 6
Hydroxy citronellal	31 20 11	29 18 11	27 17 10	23 15 8	25 18 7
Linalol	— — —	— — —	2 1 1	2 1 1	2 Na Na
Linalyl	— — —	— — —	4 3 1	5 3 2	4 Na Na
Ionones & methyl ionones	...	25 15 10	21 13 8	40 25 15	46 27 19	43 20 23
Menthol	22 — —	18 — —	20 — —	21 — —	18 — —

P=Production E=Exports C=Consumption Imports negligible * Provisional

RUBBER WITH 'BUILT IN' FLAME RESISTANCE DEVELOPED BY NATURAL RUBBER PRODUCERS

COMMERCIAL production of flame-resistant foam from natural rubber latex may become possible as a result of research work now in its final stages at the Natural Rubber Producers' Research Association at Welwyn Garden City, Herts. Hitherto, attempts to make natural rubber flame-resistant have centred around the addition of combustion-retarding materials to the latex, but this may have an adverse effect on the elastic properties of the products and may also cause processing difficulties. The latest N.R.P.R.A. work represents a new approach in which natural rubber is chemically modified so that flame resistance is 'built into' the rubber molecule. Loss of combustion-retarding components by leaching or other physical means is thereby eliminated.

The product obtained by the new technique is stated to have an appreciably higher load-bearing capacity than control samples of ordinary latex foam and, although in other properties (e.g. tensile strength) it is not quite the equal of standard latex foam, it is stated that the percentage loss of modulus after compression flexing and compression set should be quite adequate to pass most specifications. Apart from foam applications, the flame-resistant rubber might be used for the bonding of hair pads for upholstery and packaging purposes.

The required modification is achieved by reacting rubber, in the latex state,

with the polyhalogenated compound trichlorobromomethane (CBrCl_3) which adds to the double bonds of the rubber. The reaction is initiated by a redox catalyst, e.g. t-butyl hydroperoxide and tetra-ethylene pentamine, and is preferably carried out at temperatures below 30°C . To maintain adequate stability during the reaction, a stabiliser such as sodium dodecyl sulphate or potassium laurate is added to the latex.

Since the four halogen atoms of CBrCl_3 are combined with one double bond, the means are available to produce rubbers with an appreciable halogen content while still retaining a high proportion of the original double bonds. For example, a modified product containing 20% by weight of combined CBrCl_3 and 80% of rubber still retains more than 90% of the original unsaturation. For this reason, the same vulcanising systems can be used for these products as for unmodified natural rubber. The theoretical upper limit for the degree of modification is reached when every double bond of the rubber is combined with CBrCl_3 to give a product containing approximately 74% by weight of CBrCl_3 .

The new process is discussed, together with possible applications of the flame-resistant rubber, by T. D. Pendle, B.Sc., in the latest issue of *Rubber Developments*, quarterly journal of the Natural Rubber Bureau.

Fall off in Oil Refinery Demand for Platinum Not Offset by Increase in Other Industries

CURRENT needs of the oil industry and sales to that industry of platinum during the past few years have been less than they were some years ago. A discernible annual growth in the use of platinum in most other industries has not been rapid enough to offset the fall-off in demand from oil refiners. This is stated by Mr. A. B. Coussmaker, chairman of Johnson, Matthey and Co. Ltd., in his annual report for the year ended 31 March.

Despite the offer of Soviet platinum, at prices slightly below those of Johnson, Matthey, the company had held its position.

The company's refineries and factories have been very fully employed and in some cases demand had been so heavy and continuous as to justify the planning of plant extensions. Expenditure of £710,000 has been authorised for the extension of factory space and purchase of additional equipment at Wembley and Harlow. Work on both sites has started and will be completed by December 1962.

The production of cadmium pigments and colours at Kidsgrave started at the

beginning of the year and sales have considerably expanded.

During the year, Johnson, Matthey acquired the pigment business of Cowan Brothers (Stratford) Ltd., and took a majority shareholding in the business of AB Gosta Nystrom, the name now having been changed to AB Nystrom and Matthey. With establishments in Italy, France, Holland and Sweden, the company was well placed to develop trade with Europe whether or not the U.K. ultimately joined the Common Market.

Obituary

Dr. Jost Henkel, member of the presidium of the German Association of Chemical Industry (Verband der Chemischen Industrie e.V., Frankfurt), has died in Dusseldorf at the age of 51. Dr. Henkel was on the board of the Henkel and Persil synthetic detergent concerns.

Mr. E. L. Pipe, who joined F. W. Berk and Co. Ltd. in 1937, has died aged 50. Since 1946 he represented the company in the foundry industry.

Pickling Eliminated in New Wire Process

A NEW French process for galvanising steel wire has been introduced to the U.K. by A.E.I-Birlec Ltd., the furnace manufacturing organisation of Associated Electrical Industries Ltd. It is said to offer both economic and technical advantages over the conventional sequence of annealing, pickling, fluxing and dipping.

Essentially, the Birlec process eliminates the pickling stages, both of which are costly and undesirable procedures. Instead, the wire is annealed in such a way as to permit its direct entry to the zinc bath at correct temperature, thus greatly reducing the heat input needed to keep the bath hot.

Courtaulds-U.S. Link for Glass Fibres

GLASS fibres and fabrics for industrial and decorative purposes are to be produced and marketed in the U.K. in a joint venture between Courtaulds Ltd. and the U.S. textile and plastics concern United Merchants and Manufacturers Inc., New York, who already count the manufacture of glass fabrics among their activities. The exact nature of this collaborative effort and the intended capital investment have not so far been revealed, nor has the location of the manufacturing facilities.

It will be the first time that Courtaulds have joined with a U.S. company to manufacture in the U.K., although the company has links with U.S. manufacture through Courtaulds Alabama Inc. and through its recently acquired 4% stake in Koppers (C.A., 1 July, p. 10.)

New Capacitor Methods Boost Polystyrene Usage

NEW and improved manufacturing techniques have largely overcome previous limitations on the use of polystyrene as a dielectric and as a result the Plessey Co. Ltd. have introduced a range of close-tolerance polystyrene capacitors.

Standard unprotected polystyrene capacitors are normally restricted to an upper temperature limit of about 70°C because of the risk of deformation as the softening point is approached. Encapsulation of the capacitors reduces the risk of deformation and the rated temperature limit can be raised to 85°C .

Benn's Acquire 'Printing News'

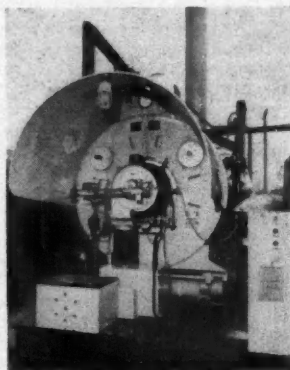
THE title and goodwill of *Printing News* has been purchased by Benn Brothers Ltd., from Printing News Ltd., as from August 1. The staff of *Printing News* have been offered continuity of employment with Benn Brothers.

As a result of this purchase, the Benn Group owns the weekly *Printing News*, the monthly *Printers Sales and Wants Advertiser* and *The Printing and Allied Trades Directory*. Altogether the Benn Group now comprises 17 journals as well as directories and year books.

**PACKAGED
BOILER
INSTALLATION**

STEAM costs have been reduced by £3,500 during the first 12 months' operation of a packaged boiler installed at the Spring Hill, Bitterne, works of Burts and Harvey Ltd., chemical manufacturers. A novel feature of this boiler installation is that it stands in the open, the company having decided to defer the building of a boiler house until future steam requirements, affected by continual expansion of the works, could be more accurately forecast.

The boiler is a Powermaster fully automatic packaged unit supplied by G.W.B. Furnaces Ltd., Dibble Works, Dudley, Worcs. It rests on a concrete base and is protected from the weather by two steel canopies which cover the



G.W.B. packaged boiler at the Burts and Harvey works

boiler's exclusive Voriflow burner and electrical control panel. After 12 months' operation the thermal efficiency of the boiler is still 83%. The boiler, which replaced a vertical oil-fired boiler, runs for 24 hr. a day, six days a week, on 3,500 secs. Redwood fuel oil. It is attended only by a part-time boiler man who makes spot checks and carries out periodic cleaning and maintenance.

**RUGGED
FLOW
METERS**

TECHNICAL advance which improves the ruggedness and reliability of their range

of "snap in" glass tube Flowrators is reported by Fischer and Porter Ltd., Salterbeck Trading Estate, Workington, Cumberland. They are now making their glass metering tubes with flame polished ends, thus effecting an improvement which greatly reduces the possibility of accidentally chipping the tube when removing it from or replacing it in its carriers.

**HIGH PRESSURE
GAS METER
ANCILLARIES**

A BASE pressure index and a base volume index are now available for

use with high pressure gas meters, eliminating the need for complicated calculations. The base pressure index automatically compensates for the gas pressure by mechanically multiplying the volume of gas by the pressure factor and registers the amount of gas at base

EQUIPMENT NEWS

Chemical Plant : Laboratory Equipment : Handling and Control Instruments

pressure which has passed through the meter. The base volume index performs an identical task but also compensates for temperature.

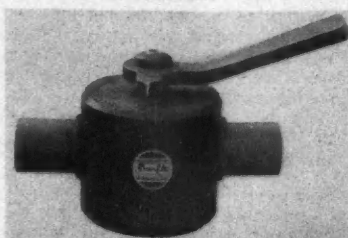
These units are available from Parkinson Cowan Gas Meters, Terminal House, Grosvenor Gardens, London S.W.1, who also offer a supplementary volume and pressure gauge for use with both instruments. This gauge plots on a chart the time and pressure at which each thousand cubic feet of gas passes through the meter, thereby providing a permanent record for analysis and reference purposes.

**MIXED BED
WATER
DEIONISER**

THE Elgastat B.112/UV mixed bed deioniser with ultra violet steriliser has been introduced by Elga Products Ltd., Lane End, Bucks, this unit providing purified water B.P., ultra pure water, and sterile deionised water for chemical, pharmaceutical and other purposes.

To prevent any possible organisms entering the system, the tap water first passes through an ultra violet tube. From there it is guided through two mixed bed ion exchange cartridges. The deionised effluent passes through a second channel in the U.V. tube to the draw off point. A conductivity meter indicates effluent quality throughout usage. Effluent purity is consistent at a minimum of 10 megohm-cm. For sterile effluent, the U.V. lamp is switched on and a panel signal confirms its operation.

Flow rate is up to 250 litres/hr. No regeneration *in situ* is essential, the Elgastat cartridge service being available. Yield between cartridge exchanges depends upon the dissolved solids in the raw water; in hard water areas some 400 litres may be drawn, in soft water areas up to 4,000 litres of sterile deionised effluent are available between cartridge exchanges. To maintain

PLASTICS PLUG VALVE

Chemical industry and other applications are envisaged for this new on/off plug valve, manufactured in p.v.c., high impact p.v.c. and most rigid plastics by Barflo Ltd., 56 Cavendish Place, Eastbourne.

Sizes are from ½ in. nominal bore

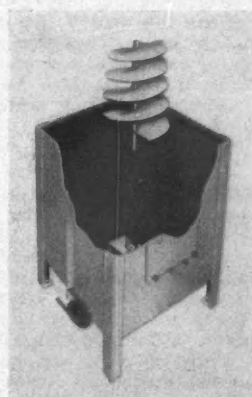
sterility, the draw off pipe is removable for sterilising. The unit is fully mobile on castors and measures 42 in. x 18 in. x 13 in. Price is £150.

**NOVEL
BATCH
MIXER**

A BATCH mixer, using a tapered worm principle, in which the whole of the

machine's capacity is effectively used as a mixing area, is now in full production at the Foxhall works, Ipswich, of E. R. and F. Turner Ltd.

When traditional methods of mixing are employed, the material is conveyed up the worm and distributed at the top around the perimeter of the circular container. In the Turner-Heesen mixer, however, an additional action is provided by the tapered worm, which causes



Turner-Heesen mixer showing the patented templates in the base of the machine which effectively turn the square design into a cone-shaped container and assist the discharge of mixed material

material to fall away along its entire length, with the collapse increasing toward the centre.

Although the Turner-Heesen machine contains no hopper, rapid discharge of the mixed material results from the use of patented templates in the base. These templates, in effect, convert the machine from a square unit into a cone shaped container.

Results of tests with chemicals such as silicates, with a particle content in the region of 1:100,000, have shown that the average mixing time is approximately 17 minutes.

The Turner-Heesen mixers are available in ½ ton to 5 ton capacities. Because of their square design they occupy less space than traditional mixers. The 1-ton machine measures 8 ft. 4 in. x 4 ft. 4½ in.

The 5-ton machine is a double unit

containing two worms, with the templates offset so that a continuous flow of material is obtained between the worms.

PACKAGING VOLATILE LIQUIDS

OFFERED as a means of packaging ether and other volatile liquids in small quantity is a gasket cap made of Rilsan (French polyamide) material. This gasket cap is claimed to overcome the problem of effecting a temporary seal after only part of the container's volatile contents has been used.

Developed by the Société d'Exploitation de Chimie Industriel Voituriez et Norman, the system utilises their monobloc aluminium container to eliminate the risk of leakage through joint or seam. The problem of the neck seal has been solved by the use of a Rilsan gasket crimped over the container neck by an aluminium sealing ring. Rilsan has been chosen for the cone shaped gasket for its barrier value and elastic modulus.

To break the positive initial seal the Rilsan cone is sliced at the top and can be used as a spout. The temporary re-seal is then obtained by compressing a red polythene overcap into a rebate in the aluminium sealing ring. Expansion of the Rilsan cone into the red overcap is caused by pressure from the volatile fluid and a seal is obtained which will be effective for several days.

The standard gasket/cap is available from W.E.X. Traders Ltd., 1-11 Hay Hill, London W.1.

ULTRASONIC DISPERSING UNIT

BASED on the principle of the liquid whistle, the Dispersonic has been specially designed for the high speed dispersion of powders in liquids. The makers claim that it makes possible the efficient production of emulsions containing solids which would rapidly wear out conventional equipment. Rough mixes of powders in liquids or emulsions are passed in a thin stream at high velocity across a blade which is thus caused to vibrate at its natural frequency of 18-22 kc/s. Cavitation is induced and extremely high localised pressures applied within the liquid stream, without the loss of energy which normally occurs in transfer from one medium to another.

The Dispersonic consists of the vibrating element and an integral pumping unit driven by a direct coupled 3 h.p. motor. It is of all stainless steel construction and is mounted on a steel baseplate, taking up only 5 sq. ft. of floor space.

A wide variety of powders such as carbon black, colloidal clay, titanium dioxide or antibiotics can be rapidly dispersed. Difficult emulsions incorporating powders can be made with a very fine

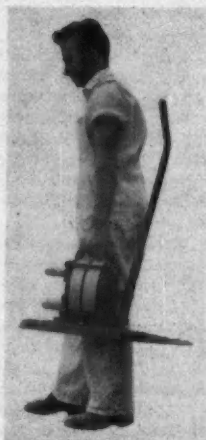
particle size, while viscous products present no problem. Throughput is approximately 5 gall./min.

Further details are available from the manufacturers, **Ultrasonics Ltd.**, Westgate, Otley, Yorks.

PORTABLE ACID PUMP

FOR works duties such as the emptying of carboys, an inexpensive portable diaphragm pump, which can be easily operated by hand by unskilled labour, is introduced by **Transkem Pumps Ltd.**, Sunlight House, Quay Street, Manchester 3. Self-priming, the pump is stated to be capable of handling a wide range of acids, alkalis, abrasive and corrosive liquors. Wearing parts have been kept to a minimum and there are no glands to maintain.

Hose connections and pump connections are in Petrox 'C', a ceramic material developed by Transkem. Diaphragms



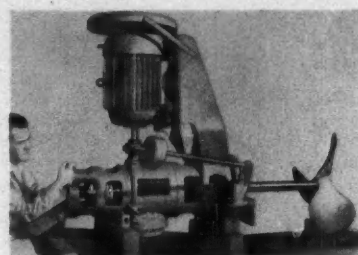
Transkem pump

are available in either rubber or Hypalon. The pump gives a total head of 30 ft. and a suction lift of 10 ft. Connections are 1½ in. bore and the base measures 24½ in. x 9½ in.

SIDE-ENTRY MIXING UNIT

FIFTY per cent greater flow capacity is achieved in the new NSE side-entry mixer made by **Lightnin Mixers Ltd.**, London Road South, Poynton, Cheshire, while installation and operating costs are reduced by as much as 50% in larger unit sizes. There are three basic sizes giving 1-50 h.p. as against the previous limit of 25 h.p. Mixers are right-angle spiral bevel gear units with hollow quill speed reducers developed specifically for side-entering applications.

It is stated that a single 50 h.p. Hi-Flo side-entry mixer will do the job of three conventional 25 h.p. units and that a



Lightnin NSE mixer with super-pitch propeller

Lightnin 20 h.p. unit will do more than the conventional 25 h.p. mixer while a 15 h.p. unit can now be used in most cases where 25 h.p. was previously required.

An auxiliary range of side-entry mixers (Series RSE) is also now available for installations not requiring the shock load protection afforded by hollow quill construction and independent bearing support, standard in the NSE line. RSE Lightnin side-entry mixers are manufactured in two basic sizes ranging from 1-25 h.p.

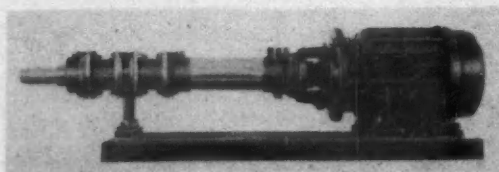
A completely new design of super pitch propellers offers improved hydraulic efficiency on both NSE and RSE mixers. Standard sizes provide optimum motor loading for common operations.

QUICK COMPRESSOR REPAIR

A TRICKY repair to a compressor in an ethylene cracking plant was carried out in three days using Master-Hone re-grinding equipment whereas a similar repair carried out previously by another method had taken six weeks, report **Nicol and Andrew Ltd.**, 20 Kelvin Avenue, Hillington, Glasgow, S.W.2. This company was called in after production had been reduced for the second time in several months because of a partial seizure of a compressor crosshead, which in this case had resulted in a badly cracked and 'fired' lower crosshead guide.

Following the metal stitching of the lower guide, Nicol and Andrew undertook to restore the original surface finish of the lower 'fired' guide by re-grinding and honing. The top and bottom guides, which take the form of two arcs of a 16 in. dia. circle by 2 ft. 6 in. long, give a total circumferential contact surface over about one third of the circle. It was considered necessary that the re-grinding and honing tool head should be supported over the whole circumference and Nicol and Andrew technicians, in co-operation with the maintenance engineers of the Chemical Company devised a means of effecting this.

Grinding was carried out with the Master-Hone equipment and the machining of the crosshead was completed in three days with the required accuracy of alignment maintained and the surface finish equal to that of the machine when new. A second compressor, which suffered similar crosshead seizure, has also been reconditioned by the same technique.



Dispersonic production homogeniser with 3 h.p. motor, for 300 gall./hr. throughput

Overseas News

DUTCH PHTHALIC CAPACITY WILL TREBLE IN 1962—NEW PLANT ON STREAM

PRODUCTION has started at the new phthalic anhydride plant at Schoonebeek, Netherlands, of Alchemica NV, a subsidiary of Scado-Archer-Daniels NV, Zwolle. The plant, which cost Fl. 1,800,000, or about £180,000, to build, has an annual capacity of 1,200 tonnes, later to be doubled to 2,400 tonnes. Working to a continuous process, the plant uses naphthalene, but could be converted to process petroleum-naphthalene or ortho-xylene.

Previously, Staatsmijnen have been the only Dutch producers of phthalic anhydride and have just expanded their capacity for this product from 2,700 tonnes to 5,000 tonnes annually, and it is stated that further expansion to about 6,000 tonnes would be easily possible. Next year Cindu are planning to open a 5,000 t.p.a. plant at Uithoorn, while Synres will open plant with a similar capacity at Hook of Holland. Capacities of both plants, the latter of which is being built in co-operation with Allied Chemical, U.S., are expected to be increased in the future.

Dutch Phthalic Producers

	1961	1962
Alchemica ... Schoonebeek	1,200	2,400
Cindu ... Uithoorn	—	5,000
Staatsmijnen ... Limburg	5,000	6,000
Synres ... Hook of Holland	—	5,000
	6,200	18,400

French Firm Doubles TiO₂ Capacity

To meet an increase in demand both at home and overseas, the French company, Fabriques de Produits Chimiques de Thann et de Mulhouse, are to double the titanium oxide capacity to 36,000 tons a year at their Le Havre works. The new unit is scheduled to go on stream in May 1962.

Solvay to Make Vinylidene Chloride Copolymers

Because of rising interest in their Ixan vinylidene chloride copolymer, now produced in a pilot plant, Solvay and Co., Brussels, are to set up a 10,000 tonnes/year plant at Tavaux in the French Jura. Now under construction, this plant will initially produce 5,000 tonnes/year from 1962, supplying not only Common Market countries but also other European and overseas countries.

Three types of products will be marketed: Ixan WN for coating cellulosic film; Ixan WA latex for paper coating; and Ixan WV for transparent film extrusion packaging.

Solvay also produce Solvic p.v.c. resins and Benvic vinyl compounds at Tavaux, where they also recently started production of synthetic glycerine and various other allylic by-products (epichlorohydrin, allylic alcohol, allyl chloride) and hydrogen peroxide.

Glycerine Gives Synthetic Fibres Anti-static Properties

Subject of U.S. Patent 2,955,960 is a process which renders synthetic fibres anti-static. It consists of treating the fibres with a liquid, water-soluble condensation product of 1 to 3 moles of a higher fatty acid with 1 mole of glycerine previously condensed in the absence of water with 3 to 40 moles of ethylene oxide.

Vinyl Acetate Plant for National Starch and Chemical

The U.S. company, National Starch and Chemical, are to build a vinyl acetate monomer plant at one of the two sites currently being considered in Texas. Costing \$4 million, the plant will have a capacity of 45 million lb./year. It is expected to be in operation by the autumn of 1962.

Bayer Explosion Cost Almost £700,000

Speaking in Leverkusen at a shareholders' meeting, Professor Dr. Ulrich Haberland, chairman of Farbenfabriken Bayer AG, has stated that the explosion at the main Leverkusen plant in December of last year cost two deaths and the equivalent of DM7,700,000, or about £690,000. The total material damage was covered by insurance, he stated, and loss of production in certain fields had been compensated for by purchases from other producers.

New French Production of Colloids and Marine Alginates

Soc. Nourylande, a French subsidiary of the Netherlands group Noury and van der Lande, recently brought into operation a new factory for the large-scale treatment of marine alginates. The plant is largely automatic and uses a new refining procedure which enables alginates of food and pharmaceutical grade quality, without odour, colour and taste, to be produced.

Until recently, the use of colloids of marine origin had certain disadvantages:

they were unstable both in the solid state and in solution; obtaining a solution was a laborious procedure; and the colour and odour of certain solutions made them unsuitable for use in food products.

At the present time, French production of alginates amounts to about 16% of the total world consumption.

'Hot Pressing' for Stearic Acid Eliminated

A process for making stearic acid which eliminates the need for 'hot pressing' has been developed by Wilson-Martin Division of Wilson and Co. Inc., Chicago.

The new technique is said to produce very high quality 'double-' and 'triple-pressed' eutectic stearic acids for such uses as cosmetics, pharmaceuticals, food additives, stearates, candles and esters using tallow as basic raw material. Wilson-Martin have evolved a unique application of ordinary distillation techniques to effect the desired eutectic composition together with unusually good heat stability. The company is willing to license the new process.

Oil Refining Extensions in W. Germany

Refinery extensions and a 30 km. pipeline are among projects in which Deutsche Erdöl AG, the West German oil concern, are expected to invest DM188 million "in the near future". The pipeline would extend from the Elbe estuary to the company's refinery at Hemmingstedt, near Heide.

The extensions would raise capacity from the present 1.5 million tons/year to 2.6 million tons. An eventual capacity of 3 million tons is envisaged as a further development.

ANIC Place Contracts for Petrochemical Plant

ANIC, a member of the Italian E.N.I. Group, have contracted out about 200 million lire worth of initial work of the erection of a petrochemical plant at Sant'Angelo near the Pisticci railway station, Southern Italy.

Olin Plan Large Scale Expansion at Omal

Olin Matheison Chemical Corporation, U.S., announce a large-scale expansion plan for their production unit at Omal, Ohio, where a sum of 'several million dollars' is to be invested. The plant is at present working to full capacity and the staff and labour force has been above normal levels since April of this year.

Mitsubishi Increase Styrene Monomer Capacity

Mitsubishi are to increase their styrene monomer capacity to 60,000 tonnes a year. At present the company is manufacturing 33,000 tonnes a year. The decision to nearly double the capacity is a result, not only of the increasing demand for polystyrene and synthetic rubber, but also the company

have the necessary benzene available for the expansion from their newly completed aromatic extraction plant. The capacity increase will be divided into two stages: 15,000 tonnes per year will be added in October 1962 and a further 12,000 tonnes will be added in January 1963. Total plant investment will be 1,240 million yen.

French Agreement on P.V.C. Plasticisers

An agreement has been signed between the Soc. de Produits Chimiques et de Synthèse and the Soc. des Produits Chimiques Péchiney Saint-Gobain in order to expand the distribution of products developed by Synthèse.

Synthèse are known for their range of plasticisers and stabilisers for p.v.c. They are constantly developing new products for this field. The contract concluded between the two organisations ensures that vinyl compounds, discovered and developed in the Synthèse laboratories and produced at their Bezon factory, will be distributed by Péchiney Saint-Gobain.

Union Carbide Research Centre Opened in Switzerland

The Union Carbide subsidiary, Union Carbide International, have opened at Versoix, Switzerland, a new research complex. The modern laboratory unit will work mainly with polythene, polystyrene, p.v.c. and copolymers in developing new and improved uses and methods of use for plastics.

Mobay to Build Multi-purpose Isocyanates Plant

A multi-purpose isocyanates plant is planned by Mobay Chemical to be built next to their existing toluene diisocyanate unit at Martinsville, W. Va. The new plant, which will be completed early next year, will produce a variety of isocyanates materials used as intermediates for pharmaceuticals, pesticides and other chemicals. Among these will be *m*-chlorophenyl isocyanate, *p,p'*-diphenylmethane diisocyanate, *p*-chlorophenyl isocyanate, octadecyl isocyanate and phenyl isocyanate. The capacity of the plant is not disclosed beyond that it will amount to several hundred tons a month.

Rock Salt Processing Plant in Sicily

SALSI of the Edison Group, Milan, are planning to build at Licata, Sicily, a large plant for processing of rock salt. Construction is to be started during the coming autumn and the plant is due to go on stream early in 1964. Initial capacity will be 5,000 tonnes a day.

Sherritt Plan Urea Plant at Fort Saskatchewan

Sherritt Gordon Mines Ltd. are to make an immediate start on construction of a urea plant at Fort Saskatchewan, with production scheduled to start in the second half of next year. Cost of the plant is estimated at about \$3 million

and capacity will be about 35,000 tons a year. Urea will be produced in both prill and crystal form.

Ammonia and carbon dioxide, essential raw materials for urea, are available from the company's present operations at Fort Saskatchewan. Urea sales will be handled through Harrisons and Crosfield (Canada) Ltd., sales agents for Sherritt's fertiliser and chemical products.

Dow Canadian Plants on Stream in August

Dow Chemical of Canada, Sarnia, Ont., state that all units of their two new Western Canada plants will be in production in August. First shipments have already been made from the pentachlorophenol unit at Fort Saskatchewan, while ethanolamines and glycols from the same plant, and phenol from the plant at Ladner, B.C., will be on stream by 15 August.

Tannin Extract Plant for Colombia

A plant for the production of tannin extract is this year to be built at Riohacha, on the Guajira peninsula of Colombia, by the country's Instituto de Fomento Industrial. Starting material will be *divi-divi*, which hitherto has been exported to Federal Germany for processing and then re-imported. The plant, which will probably be made over to private industry after its opening, will supply the home market and may export part of its production.

Oil Refinery Project for U.A.R.

Some £E20 million, one-half of this sum to be invested initially, is given as the value of a special oil refinery to be built as a base for a petrochemical industry at Suez, in the Egyptian region of the United Arab Republic. The construction of the plant has been given on tender to Compagnia Tecnica Industrie Petrolio, of Rome, by the U.A.R. Government. The project will be completed during 1963.

New French Process for Steel Making

The use of the Recherches des Industries Siderurgiques (I.R.S.I.D.) process for the production of steel from cast iron by the injection of oxygen and lime is expanding rapidly in Europe. The principle of the process is similar to that of a Bessemer converter but it uses lime in powder form and oxygen instead of air.

The process has been tested on a large scale for some time in a 30-ton converter operating at Dillingen in the Sarre. With this process the refractory linings can be used for 200 operations. The proportion of lime to oxygen can be regulated with considerable accuracy thus avoiding foam from the silicious slags forming on the surface of the metal ore. The composition of the steel can be exactly controlled and the de-phosphorisation is almost complete.

Vinyl Acetate Plant for National Starch

Plans for a \$4 million vinyl acetate monomer plant in Texas, with a capacity of 45 million lb./year, have been announced from New York by National Starch and Chemical Corporation. The plant will be located at one of two sites currently being considered. Construction which will be handled by Brown and Root Inc., is scheduled to start late this year and the new plant is expected to be in operation in the autumn of 1962.

National Starch, prominent producers of p.v.a. polymers and copolymers, have polymer plants at Plainfield, and Meredosia, Ill. Additional polymerisation plants are located in Toronto, Mexico City, Slough (England) and Sydney.

Sifto Salt Test Drill Sodium Sulphate Deposits

Sifto Salt Ltd., a subsidiary of Dominion Tar and Chemical Co. Ltd., have started a drilling programme to determine the most economic means of recovering sodium sulphate from deposits at Weldon, New Brunswick.

Synthetic Resins and Solvents in France

EPOXY resins are assuming an ever-increasing importance in the paints and plastics industries in France. Of the best known of these are Epikotes of which 1,000 tonnes a year are produced by Shell-Saint-Gobain at their Berre factory. Acrylic resins are manufactured principally by Altulor-Nobel-Bozel and the Société Française d'Organo-Synthèse, and phenolic resins are produced by Huiles, Goudrons et Dérivés, Résines et Vernis Artificiels and La Bakélite. The annual production of glycerophthalic resins is of the order of 9,000 tonnes produced by Compagnie Française des Matières Colorantes, Société Résines et Vernis Artificiels, Altulor, Huiles, Goudrons et Dérivés and Reichhold-Bekacite.

The paint and varnish industry is the principal user of solvents in France,

absorbing about 40% of the total consumption. The French production of oxygenated, chlorinated, aromatic and aliphatic solvents now exceeds 35,000 tonnes a year. Estimated production and consumption for 1962 is 405,000 tonnes and 365,000 tonnes respectively.

Most large French petrochemical companies include solvents in their range of products. Rhône-Poulenc and Progil-Electrochimie produce acetone and phenol by the cumene process; Shell-Saint-Gobain produce propylene derivatives; base raw materials are produced at Port-Jérôme by Esso-Standard; methyl ethyl ketone is produced by Standard-Kuhlmann and chlorinated solvents are produced by the Péchiney group at Saint-Auban, by Naphtachimie, a subsidiary of Péchiney, and by Pétroles B.P.

Bookshelf

Infra-red Absorption of Inorganics Useful for Labs.

INFRA-RED ABSORPTION OF INORGANIC SUBSTANCES. By Kathryn E. Lawson. Chapman and Hall (Reinhold), London. 1961. Pp. vii + 200. 54s.

The frequency-structure correlations which are so profitable an aspect of the infra-red spectra of organic molecules have been repeatedly summarised, most thoroughly in Bellamy's book. By comparison, the systematic use of infra-red studies in the inorganic field suffered an almost inexplicable delay until the early 1950's. The present volume is an attempt to collect the data for inorganic structures investigated in the decade following 1950.

It consists of a very competent essay of 76 pages reviewing frequency-structure aspects of the simpler inorganic compounds (70 pages) and a brief reference to complex compounds (six pages). There are 26 short tables giving, for instance, frequencies for various families of molecules (MF_6 , MFe_2O_4 , $MTiO_3$, etc.). The presentation resembles that of an Annual Reports article, and contains virtually nothing from the literature before 1950.

A glossary of nine pages containing such diverse entries as 'hygroscopic' and 'point group' is followed by an unclassified list of references (100 pages) on infra-red and related studies in the inorganic field compiled from *Chemical Abstracts*.

The volume will be useful in the infra-red laboratory but its price is exorbitant for the 76 pages of original material it contains.

Laboratory Chemistry

ESSENTIALS OF CHEMISTRY IN THE LABORATORY. By H. W. Frantz and L. E. Malm. W. H. Freeman and Co., San Francisco and London, 1961. Pp. 308. 18s.

This manual may be considered as an adaptation of Frantz's 'A Laboratory Study of Chemical Principles': approximately half the material is common to both books but is rearranged. Whereas the latter leads up to qualitative inorganic analysis, the present text is intended to provide a first year course with a wider syllabus including organic chemistry and some biochemistry, while occupying only 50 more pages. In order to achieve this the basic general chemistry is treated more rapidly, titrations involving oxidising and reducing agents and discussion of solubility products are omitted, and analysis for cations is restricted to 10 metals; there is additional material on the chemistry

of the halides, nitrogen and sulphur and simple preparations of inorganic salts, besides the section on simple organic (aliphatic) compounds, simple biochemical tests for carbohydrates, proteins, fats and a few organic syntheses of doubtful value in view of the thinness of the course. The diagrams by Haywood are useful and clear, there being a few additions and subtractions from the previous book.

The book seems to be designed for biological students who require some knowledge of chemistry.

Identification

TABLES FOR IDENTIFICATION OF ORGANIC COMPOUNDS. Compiled by M. Frankel, S. Patai, R. Farkas-Kadmon, A. Zilkha. Chemical Rubber Publishing Co., Cleveland, 1961. Pp. viii + 239.

These tables are published as a supplement to the well known Handbook of Chemistry and Physics. They list the melting points and boiling points (sometimes also refractive index) for 4,380 parent compounds and up to eight derivatives, commonly used for identification, for each parent. The tables are solely lists of these physical properties. They should serve as a convenient source of such information. It is unfortunate that no indication is given of the sources from which the tables were compiled. It would be useful to know how much Beilstein was relied upon and whether all data were checked with the original publications.

It is interesting to note that a rising number of Israeli scientists, frequently with American support, are becoming major tabulators of scientific information.

Biochemists' Handbook

THE BIOCHEMISTS' HANDBOOK. Edited by C. Long. E. and F. N. Spon Ltd., 1961. Pp. 1192. 168s.

It is not possible to do justice to this book in a few words. This is a compilation of facts rather than opinions which is divided into six main sections: (1) Chemical data—198 pages of largely physicochemical data to support existing handbooks; (2) Individual enzymes—198 pages covering some 300 enzymes, classified according to function; (3) Metabolic pathways—102 pages of material useful for research or teaching; (4) Chemical composition of animal tissues and related data—271 pages of information classified according to tissue; (5) Chemi-

cal composition of plant tissues and related data—96 pages of information classified by nature of the substance; and (6) Physiological and nutritional data—62 pages. These are supported by an excellent 65 pages of subject index, many tables and fine diagrams. The material was supplied by 171 contributors.

This should be a most useful acquisition to any departmental or sectional library as a source of factual information and providing a starting point for searches of the literature through the excellent lists of references at the end of chapters. Further editions are promised to be even more comprehensive.

Surface Activity

SURFACE ACTIVITY. By J. L. Moilliet, B. Collie and W. Black. E. and F. N. Spon Ltd. London, 1961. Pp. xiii + 518. 75s.

This is a revised and enlarged version of the volume published in 1951 by the first two authors. It retains the same divisions in its account of fundamental aspects, applications, and surface-active materials. Written by scientists intimately concerned with the applications of their subject, it is one of the most useful volumes in this field of physico-chemical principles and practice.

The section on fundamental aspects has been expanded from 145 to 207 pages and now includes summaries of surface-activity studies of electrolytes and macromolecules, and of the concepts associated with the work of Derjaguin and Overbeek. Some 50 pages have been added in the coverage of technical applications: the account of detergents is extended by a third of this increase. As the original material has been retained, this volume is essentially an up-to-date version of an established text.

Phosphate Deposits

WORLD SURVEY OF PHOSPHATE DEPOSITS, VOL. 3, WEST, SOUTH AND EAST AFRICA. British Sulphur Corp., London, 1961. Pp. ix + 97. 1260s.

This is the first volume of a series of six which can be bought collectively for 300 guineas. It claims to be the product of four years research and to cover every known deposit of commercial interest. The present volume is a methodical compilation based on published literature and some unpublished surveys made by various companies. Judged by normal standards the price is astronomical, but those companies that need such a survey will welcome the series because it will be cheaper to buy than to have it written specially for them by one of their own geologists. It would be interesting to know if the series made money for the publishers.

Books Received

GAS CHROMATOGRAPHY ABSTRACTS. Edited by C. E. H. Knapman. Butterworths, London, 1961. Pp. xi + 200. 42s.

INDUSTRIAL CHEMISTRY—Target for Careers. By W. Davey. Robert Hale Ltd., London, 1961. Pp. 110. 8s 6d.

● **Dr. Rudolph Lessing** has relinquished his position as managing director of Hydronyl Ltd., 14 Gloucester Road, London S.W.7, which he has occupied since the formation of the company in 1914. He has been appointed deputy-chairman. Dr. Lessing was president of the National Society for Clean Air from 1956 to 1958 and has also been a vice-president of the Society for Chemical Industry. He is vice-chairman of the British Chemical Plant Manufacturers' Association and vice-president of the Faraday Society.

● **Mr. C. H. M. Baker**, a director of Firestone Tire and Rubber Co., has been elected president of the Federation of British Rubber and Allied Manufacturers for 1961-62. **Mr. D. E. Cameron**, chairman and managing director of B.B. Chemical Co. Ltd., and **Mr. D. D. Marshall**, deputy chairman and managing director of the Irwell Rubber Co., have been elected vice-presidents.

● **Mr. H. V. Potter**, who has been elected into the Court of Assistants of the Worshipful Company of Horners, is a former chairman and managing director of Bakelite Ltd. He relinquished his executive duties in 1955 and retired as chairman in 1959, but still continues as a director of Bakelite and retains an active interest in the plastics industry.

● **Dr. A. G. Winn**, works manager of the I.C.I. Billingham Division plants at Severnside, has been appointed technical department manager of the division as from 1 December. He succeeds **Dr. P. W. Reynolds** who will become technical director of Billingham Division on the retirement later this year of **Mr. P. Mayne**. **Dr. J. Maggs**, of technical department, has been designated works manager of Billingham Division's Severnside plants.

● **Mr. Roger Lawson**, for the past 10 years estimating and contracts engineer for Boots Pure Drug Co. Ltd., has been appointed assistant chief engineer.



F. W. Stokes, left, newly appointed managing director of Powell Duffryn Carbon Products Ltd., Hayes, Middlesex. Right is **H. E. Styles**

● **Mr. H. E. Styles**, superintendent of laboratories for London Transport since 1950, has been appointed director of research in succession to **Mr. A. T. Wilford** who retired on 29 July. **Mr. A. G. Collings**, who has been appointed assistant director of research, is at present assistant superintendent of laboratories (chemist). Both Mr. Collings

PEOPLE in the news

and Mr. Styles are fellows of the Royal Institute of Chemistry.

● **Professor Ulrich Haberland**, chairman of Farbenfabriken Bayer AG, Leverkusen, has been awarded by President Gronchi, of Italy, with the Italian order Knight of the Grand Order of Officers for his service to German-Italian relations. This follows the granting of a similar Austrian order, the Grand Silver Badge of Honour with Star, by Austrian President Schärff for services to the Republic of Austria.

● **Mr. R. W. Rowledge**, managing director of United Glass Ltd., has been appointed chairman of their wholly-owned subsidiary, Alloa Glass Ltd. **Mr. F. T. Knight**, at present works director of Alloa Glass, has been appointed managing director of that company, and **Mr. K. G. Duncan**, sales director.

● **Dr. W. Bridge**, deputy works manager at the Cassel Works, Billingham, of I.C.I. General Chemicals Division since 1956, has been appointed works manager of the division's Wade Works, Northwich, Ches, with effect from 1 January next.

● **Mr. E. E. Haddon** is to succeed **Dr. E. A. Perren** who is retiring as director of the War Office Chemical Defence Experimental Establishment, Porton. Mr. Haddon is at present director of chemical defence research and development at the War Office. On taking up his new appointment on 31 July he was promoted chief scientific officer. After his retirement, Dr. Perren will continue to serve in the research laboratory at Porton.

● **Mr. W. V. Hughes** and **Mr. E. H. Leadbeater** have been appointed directors of Blythe Colour Works Ltd., Stoke on Trent.

● Under the terms by which Burrell and Co. Ltd. have acquired the interest of Bullough Securities Ltd. in Cornbrook Chemical Co. Ltd., **Mr. H. Gosling**, a director of Cornbrook, and **Mr. J. Maxwell**, a director of Cornbrook and Bulloughs, will join the Burrell board. **Mr. P. Gibson** and **Mr. G. E. Hillier** are to become directors of Cornbrook, while **Mr. J. Maxwell** and **Mr. G. A. R. Mead**, who is also a director of Bul-

lough, will both retire from the board of Cornbrook Chemical Co.

● **Mr. A. C. Evans**, of the Department of Chemical Engineering, University of Leeds, has been awarded a research scholarship to the value of £450/year, for two years in the first instance, under the C.J.B. scholarship scheme administered jointly by the Institution of Chemical Engineers and Constructors John Brown Ltd.

● **Mr. C. T. Ward**, managing director of Plant Protection Ltd., and **Dr. E. Holmes**, technical services director, both of whom retired on 31 July, have each been with I.C.I. for 33 years. Mr. Ward



C. T. Ward



Dr. E. Holmes

became home sales director of Plant Protection in 1951, being appointed managing director in 1952. He was also a director of Bayer Agriculture Ltd., a subsidiary of Plant Protection, and a director of the Chipman Chemical companies in the U.K. and Canada. **Mr. W. Johnstone**, commercial director of Plant Protection, is now responsible for home sales. A pioneer of the crop protection industry in the early 1930's, Dr. Holmes became head of Plant Protection's technical department in 1940 and technical services director in 1956. **Dr. W. R. Boon**, research and development director of the company, is now responsible for technical services work.

● **Dr. D. C. Pepper** has been appointed to a newly established chair of Physical Chemistry at the University of Dublin. He is a fellow of Trinity College.

● **Mr. Jan Platou**, a Norwegian, has been appointed information specialist in the European office of the Sulphur Institute. He will join the Institute on 1 September and will be located in London. He will have responsibility in Europe for the technical information services in support of the Institute research and educational programmes relating to agricultural and industrial uses of sulphur in all its forms.

● **Mr. Alex Lewis, Jr.**, has been appointed chairman and **Dr. Nino Rovelli** manager of Società Italiana Resine Gulf S.p.A., Sassari, Sardinia, the new Italian chemical subsidiary of Gulf Oil Corporation, Pittsburgh, U.S.

● **Mr. H. W. Cremer**, **Prof. M. B. Donald**, **M. F. A. Greene**, and **Sir Harold Hartley** have been elected to honorary membership of the Institution of Chemical Engineers in the class of Corporate Members, in recognition of their long and distinguished service to the Institution.

Commercial News

British Oxygen

British Oxygen (Hong Kong), a subsidiary of British Oxygen Co., have acquired the capital of the Hong Kong Oxygen and Acetylene Co., manufacturers and suppliers of industrial gases.

British Oxygen have also acquired from Van Leer Vatenfabrieken N.V. of Amsterdam, half the capital of Industrial Gases, a Nigerian company based at Lagos.

Cornbrook Chemical

Burrell and Co. Ltd., whose production of colouring materials is marketed by the subsidiary J. W. and T. A. Smith Ltd., have agreed to acquire the holding of Bullough Securities Ltd. in the Cornbrook Chemical Co. Ltd. Cornbrook who also produce dyes are to continue operations under their own name. This acquisition will it is thought strengthen both businesses and lead to reductions in production costs. Bullough Securities also hold the shares of the British Dyewood Co. Ltd. and J. L. Rose Ltd. (see also 'People in the News').

D.C.L.

In response to the Distillers Co.'s rights offer (C.A. 15 July, p. 88), shareholders have accepted 17,354,243 of the 19,652,032 shares at 32s 6d/share. The balance of 2,297,789 shares (11.7%) will be taken up by the underwriters as it has proved impracticable to sell them at a premium.

Fisons

Fisons propose to modify the rights attaching to the 6% unsecured loan stock 1976-81. It is stated that the highly seasonal nature of the Group's trade can result in very large requirements for temporary facilities for finance, and it is considered that certain of the restrictions in the Loan Stock Trust Deed, particularly those of unsecured borrowings, could in certain circumstances unduly hamper development.

If approved, the loan stock will be redesignated as 6%. Second debenture stock 1976-81. No change is proposed in the provisions regarding interest, redemption and purchase.

Macarthy's Pharmaceuticals

London and Yorkshire Trust announce that the offer for sale of 300,000 ordinary shares of 4s in Macarthy's Pharmaceuticals Ltd. at 10s 9d/share was nearly six times over-subscribed. Preferential applications for 28,200 shares have been allotted in full. After excluding certain applications, mostly multiple applications, all applicants will receive an allotment on a reduced scale, graduated according to the number of shares applied for.

Cosden Petroleum

Cosden Petroleum Corporation, a subsidiary of W. R. Grace, reported net earnings of \$4,770,224 for the fiscal year

- New Acquisitions for British Oxygen
- Naarden Buy Raw Materials Company
- Scado Set Up Swedish Production Firm
- Burrell Acquire Interest in Cornbrook

ended 30 April, or \$1.59 a share (\$4,763,414, or \$1.60 a share). Gross operating income was \$82,131,975 (\$82,496,975).

An estimated 25% of net income was attributed to petrochemicals, which accounted for 4.4% by volume of Big Spring Refinery's input. Cited among recently completed petrochemical ventures were the expanded styrene and polystyrene facilities.

E.N.I.

The Italian State-owned oil corporation, E.N.I., made a profit of 6,200 million lire (nearly £3.6 million) in the year 1960-61. Taxes took 4,000 million lire, 1,300 million went to the ordinary reserve fund and 900 million was allocated to research and training.

French High Vacuum Merger

Soc. Générale du Vide (SOGEV) is the name of a new company formed in Paris to operate in the field of vacuum technique. The company has arisen from the merging of the three French specialists in this branch, Cie Générale de Radiologie (vacuum division), Cie Française Thomson-Houston (vacuum division) and Laboratoire des Basses Pressions.

Furukawa Chemical

Amoco Chemical Corporation, Chicago, have taken up a considerable minority interest in the Japanese company Furukawa Chemical Industries Ltd., Tokyo. The latter company produces among other things polythene and copolymers under licence from Standard Oil of Indiana.

Von Heyden

Chemische Werke von Heyden AG, Munich, are to pay as dividend for the 1960 financial year 10% (same) plus 2% bonus on their capital of DM8,040,000.

Hibernia

Hibernia AG, Herne, West Germany, report for last year a turnover in chemical products of some DM160 million (DM161 million for 1959 and DM157 million for 1958). Hibernia own the chemical company Scholven-Chemie AG, whose 1960 results were reported in 'Commercial News' 29 July, 170.

Naarden

The Dutch concern Chemische Fabriek 'Naarden' is reported to have extended its manufacturing interests by the acquisition of an unnamed company producing organic chemical raw materials. It is thought that the acquired company may be based in France with a number of branches in Europe and elsewhere. Its production programme is understood

to be complementary with that of Naarden.

The takeover price was approximately Fls. 3.5 million. In exchange for the acquired company's entire share capital, Naarden have issued an additional Fls.800,000 of their own shares, bringing the total share capital outstanding to Fls. 7,055,000.

The new company will be amalgamated with the group's French subsidiary, S. A. Naarden (France) of Paris.

Interitalia

Chemical and pharmaceutical shares now form the biggest single section of the Italian investment fund Interitalia, with 16% of the fund total. By 30 June 1961, total fund holdings had risen to 2,600 million lire from a level of only 2,100 million lire at the end of the first 1961 quarter.

Scado-Archer-Daniels

Scado-Archer-Daniels AB is to be the name of a company to be set up by Scado-Archer-Daniels in Sweden for the opening near Malmö on 1 February 1962, of a new chemical products unit. The company, already producing phthalic anhydride in the Netherlands (see 'Overseas News') also plans to produce in the E.F.T.A. area.

U.S. Borax

Net income of United States Borax and Chemical Corporation, U.S. operating company of Borax (Holdings) Ltd., London, declined to \$1,840,399 in the three months ended 30 June 1961 from \$2,095,269 in the corresponding 1960 period, amounting to 40 cents per common share against 46 cents. Net sales during the period were \$17.1 million (\$18.6 million).

For the nine months to the end of June, net income was \$4.6 million (\$5.4 million), equal to 98 cents (\$1.17) per common share; net sales being \$49.9 (\$51.2) million.

The company reports that while domestic industrial sales of borax continued to show improvement, recovery from recession has not been rapid, at least as far as borax consumption is concerned. Borax export sales of late have not been so strong as anticipated. There is some lessening of confidence in Europe, which is reflected in the reduction of inventories rather than in the rate of consumption.

Potash sales were considerably below the third quarter of 1960, but sales of consumer borax products continued to show a steady increase. The directors are hopeful that earnings for the full year will compare favourably with last year.

TRADE NOTES

Q. and Q. Prices Rise

Rising costs have forced Quickfit and Quartz Ltd., Quickfit Works, Heart of Stone, Staffs, to increase prices by 5% on all orders received from 1 August.

S. Smith Reorganisation

All industrial manufacturing facilities of S. Smith and Sons (England) Ltd. and U.K. subsidiaries will be integrated into the appropriate sales divisions and to achieve this all the assets of and undertaking of the subsidiary, Kelvin and Hughes Ltd. are being transferred to Smiths. The Hillington factory of Kelvin and Hughes will become part of the industrial division of S. Smith.

Change of Address

Metal Pretreatments Ltd. have moved to Abbot Close, Oyster Lane, Byfleet, Surrey (Byfleet 42581).

Change of Name

Codron Industrial Agencies Ltd., 11/12 Finsbury Square, London E.C.2, have changed their name to Berkshire Industrial and Chemical Agencies Ltd.

Pyrex Sales Team

Three new appointments have been made to the industrial sales representatives team of James A. Jobling and Co. Ltd., as part of the plan to continue the sales expansion started in 1960, when there was an exceptional increase in the sales of scientific and industrial products.

The new appointments are: London postal area, Mr. D. C. A. Lown; North Midlands area, Mr. E. V. Saunders, and South Western area, Mr. J. H. Prime.

Non-ionic Surfactants

A technical data sheet describing Polychol non-ionic surfactants has been produced by Croda Ltd., Cowick Hall, Snaith, Goole, Yorks. Tabulated data for composition and properties are given and uses as emulsifying and dispersing agents, etc., are discussed.

U.C. Ethylene Glycol

Manufacturers of ethylene glycol for more than 35 years, Union Carbide Ltd., 8 Grafton Street, London W.1, have issued a leaflet giving technical data on their material for use as anti-freeze.

Lightnin Mixers

Lightnin Mixers Ltd., Poynton, Ches., fluid mixing machinery manufacturers, have appointed Geesin and Read of Glasgow as their technical representatives in Scotland.

Concentrated Wormkiller

A new concentrated wormkiller has been added to the Supplex range of horticultural products sold by F. W. Berk and Co. Ltd., 8 Baker Street, London W.1. Containing Chlordane, it is also fatal to leather-jackets, ants, chafer grubs and other pests.

The wormkiller is available in both

liquid (75% emulsifiable concentrate) and granular form, at present only in quantities appropriate to large users, but individual packs will be introduced during 1962.

Market Reports

Holiday Stoppages Restrict Movement

LONDON Quiet conditions have been reported from most sections of the industrial chemical market, with little change in prices.

The annual holiday stoppages for industry have restricted the movement of supplies against contracts. New business on home account is limited to spot or nearby requirements. The flow of export inquiry has been maintained at a good level and the supply position generally is fairly easy.

Allowing for seasonal influences, activity in the coal tar products market is steady.

SCOTLAND Business during the past week has again been quiet in the Glasgow area, due to the holiday period. There has however been some forward bookings from those areas not yet affected. Prices for the most part have been steady. The overseas market continues to show quite a volume of activity, particularly in regard to Commonwealth countries.

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Continued from page 206

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NEW PATENTS

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Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 6 September

- Phosphatic fertilisers. Fisons Fertilisers Ltd. 876 563, 876 565
- Wall and like surface coating compositions containing polyvinyl acetate emulsions. Terrazao (Proprietary) Ltd. [Addition to 834 288] 876 713, 876 714
- Dehydrosteroids and pharmaceutical preparations containing them. Ciba Ltd. 876 810
- Transfer coating compositions. Burroughs Corp. 876 854
- Organic salts of polymers containing carbonyl groups. Hoyt Metal Co. of Great Britain Ltd. 876 603
- Continuous process for the preparation of 1:4-dibromobutane. Cellulose-Polymeres et Derives Cepede S.A. and Red-GmbH. 876 921
- Process for the preparation of adiponitrile. Cellulose-Polymeres et Derives Cepede S.A. and Red-GmbH. 876 922
- Peptides and the preparation thereof. Ciba Ltd. 876 570
- Polypeptides and derivatives thereof and the manufacture thereof. Ciba Ltd. 876 571
- Process for the polymerisation of ethylene. Du Pont de Nemours & Co., E. I. 876 694
- Process and apparatus for the disinfection of sewage. Canzler, H. (trading as Canzler, C. (firm of)). 876 846
- Azo-dyestuffs, containing a monohalogenated triazine nucleus, their manufacture and use. Ciba Ltd. 876 923
- Process for separating acetylene from gaseous mixtures containing it. Farbwerke Hoechst AG. 876 494
- Expanded thermoplastic materials. Whiffen & Sons Ltd. 876 870
- Manufacture of hydantoin derivatives. Smith Kline & French Laboratories Ltd. 876 573
- Corrosion resistant articles. Montecatini. [Addition to 810 023.] 876 696
- Alkali metal salts and alkaline earth metal salts of N'-isonicotinylhydrazine N-glucuronide and a process for the production. Chugai Seiyaku Kabushiki Kaisha. 876 697
- Manufacture of sulphonyl-ureas. Farbwerke Hoechst AG. 876 608
- Method of preparing a gel using a carboxymethyl dextran. Clarkson, A. H. (Commonwealth Engineering Co.). 876 927
- Cyclopentanophenanthrene derivatives and process for the manufacture thereof. Syntex S.A. 876 986
- Purification of hydrated silica. Columbia-Southern Chemical Corp. 876 671
- Production of pigmentary titanium dioxide. Du Pont de Nemours & Co., E. I. 876 672
- Process for the reduction of double salts of niobium or tantalum pentahalides. Ciba Ltd. 876 882
- Hydrophilic alkali and amine salts of carboxyl-group containing copolymers and manufacture and application thereof. Ciba Ltd. 876 495
- Laminated materials. Montecatini. [Addition to 810 023.] 876 987
- Monoazo triazine dyestuffs. Imperial Chemical Industries Ltd. [Addition to 774 925.] 876 632
- Process for the continuous manufacture of polyvinyl alcohol, filaments which suffer no shrinkage in boiling water. Farbwerke Hoechst AG. 876 595
- Process for preparing salts of quaternary ammonium monoazo dyes. American Cyanamid Co. 876 633
- Hydrogenation. British Petroleum Co. Ltd., Haresnape, J. N., and Yeo, A. A. 876 485
- Cyclopentanophenanthrene derivatives and process for the production thereof. Syntex S.A. 876 902
- Thiocyanhydrins of the steroid series and a process for their manufacture. Schering AG. 876 634
- Metalliferous ortho:ortho'-dihydroxy-monoazo-dyestuffs. Durand & Huguenin AG. 876 486
- Process for preparing an antibiotic designated FI. 1163. Soc. Farmaceutica Italia. 876 635
- Calcination of alumina. Dorr-Oliver Inc. [Addition to 781 994.] 876 597
- Preparation of acetonedicarboxylic acid and esters thereof. Pfizer & Co., Inc. Chas. 876 487
- Polymerisation of monoolefins. Du Pont de Nemours & Co., E. I. 876 638
- Purification of solid polymers. Monsanto Chemical Co. 876 737
- Production of alkyl pyridines. Aries, R. S. 876 747
- Epoxides. Dehydag Deutsche Hydrierwerke GmbH. 876 489
- Antifungal antibiotic antifongine 4915 and compositions thereof. Laboratoires Francais de Chimiotherapie. 876 639
- Thioglycolic acid derivative and process for the production thereof. Uclaf. 876 966
- Polymerisation process. Ciba Ltd. 876 674
- Production of polyethylene with narrow distribution of the molecular weight. Studiengesellschaft Kohle. 876 492
- Sulphonation of alkylated aromatic hydrocarbons. Chemithon Corp. 876 519
- Reserpine acid esters and process for their manufacture. Ciba Ltd. [Addition to 744 290.] 876 717
- Urea compositions. Imperial Chemical Industries Ltd. 876 675
- Production of polyvinyl chloride and copolymers containing vinyl chloride. Chemische Werke Huls AG. 876 967
- Metal complexes of monoazo dyestuffs. Imperial Chemical Industries Ltd. 876 718
- Process for the production of aminobenzoic acid derivatives and their use in pest control. Geigy AG., J. R. 876 526
- Urea compositions. Imperial Chemical Industries Ltd. 876 676
- Preparation and recovery of esters of acetonedicarboxylic acid. Pfizer & Co. Inc., Chas. 876 488
- Water-insoluble diazo-dyestuffs and process for their manufacture. Ciba Ltd. 876 527
- Orthohydroxy-azo dyestuffs and process for their manufacture. Farbwerke Hoechst AG. 876 972
- Monoazo dyestuffs derived from the urea or thiourea and the production of same. Badische Anilin- & Soda-Fabrik AG. 876 496
- Copper complexes for monoazo-dyestuffs and process for their manufacture. Ciba Ltd. 876 815
- Production of polyvinyl chloride and copolymers containing vinyl chloride. Chemische Werke Huls AG. [Addition to 876 967.] 876 968
- Organic salts of substituted quinolines and process for the manufacture thereof. Chemische Fabrik Schweizerhall. 876 678
- Pharmaceutical compositions containing amino-anthrapyrimidines. Imperial Chemical Industries Ltd. 876 719

- Process for separating normal paraffins from hydrocarbon oils. Bataafse Petroleum Maatschappij N.V. 876 529
- Dimerization of olefins. Imperial Chemical Industries Ltd. 876 680
- Preparation of manganese carbonyl hydride. Ethyl Corp. 876 530
- Steroid compounds. Soc. Farmaceutica Italia. 876 721
- Process for the preparation of saturated or unsaturated cyclododecanones. Studiengesellschaft Kohle. 876 531
- Substituted 6-deoxytetracyclines. American Cyanamid Co. 876 500
- Biuret polyisocyanates. Farbenfabriken Bayer AG. 876 593
- Polymerisation and catalysts. Union Carbide Corp. 876 532
- Production of alkylene oxide polymers. Petrochemicals Ltd. 876 533
- Dyeing properties of polyethylene terephthalate. Union Carbide Corp. 876 534
- Manufacture of inorganic thiocyanates. Courtaulds Ltd. 876 711
- Metal phosphorodithioates as oxidation-corrosion inhibitors. Continental Oil Co. 876 505
- Polyurethane foam. Lockheed Aircraft Corp. 876 977
- Stain inhibitors for polymers. Imperial Chemical Industries Ltd. 876 710
- Process of producing polyolefin oxides with metallic sulphate catalysts. Dow Chemical Co. 876 689
- Preparation of organoboron compounds. United States Borax & Chemical Corp. 876 690
- 5,7-Dihydroxy-2H-V triazolo-[a] pyrimidine derivatives. Sterling Drug Inc. 876 694
- Production of branched-chain aliphatic hydrocarbons. Universal Oil Products Co. 876 730
- Rigid polyurethane foam. Atlas Powder Co. 876 469
- Pyrimidine derivatives. Imperial Chemical Industries Ltd. 876 681
- Chromium-containing addition agents. Union Carbide Corp. 876 958
- Rubber vulcanisates with azone resistance. Esso Research & Engineering Co. 876 509
- Resinous compositions. American Cyanamid Co. 876 939
- Process for the manufacture of isoprene from 4,4-dimethylmeta-dioxane. Institut Francais du Pétrole, des Carburants et Lubrifiants. 876-960
- Method of fluorinating benzo-trichloride and its alkyl- and chloro-substitution products. Wasag-Chemie AG. 876 510
- Graft copolymers and shaped articles consisting of or containing them. Dow Chemical Co. 876 535
- Process for preparing a dihalobicycloheptadiene. Universal Oil Products Co. 876 962
- 3-Pyrrolidyl ethanol. Mead Johnson & Co. 876 941
- Manufacture of alkylated aromatic compounds. Esso Research & Engineering Co. 876 963
- Production of polymeric material from monomeric epoxy compounds. Petrochemicals Ltd. 876 648
- Crease resistant resin composition for textiles. Dow Chemical Co. 876 649
- Rubber. Goodrich Co., B. F. 876 585
- Production of aluminium tri-alkyl compounds and alkyl aromatic therefrom. Esso Research & Engineering Co. 876 536
- Fermentative process for producing L-glutamic acid. Ajinomoto Co., Inc. 876 943
- Steroids and the manufacture thereof. Upjohn Co. 876 512
- Compositions containing 3-amino-1,2,4-triazole for use in the economic eradication and/or suppression of undesirable plant growth. Amchem Products, Inc. 876 461
- Isomerisation process. Universal Oil Products Co. 876 462
- Derivatives of 3:4-dihydro-1:2:4-benzothiadiazine-1:1-dioxide and process for their manufacture. Ciba Ltd. 876 755
- Process for preparing hydroxymethyl furfural. Atlas Powder Co. 876 463

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